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Editors' Introduction

Joseph Claudet
Guest Editor
Texas Tech University
& Douglas J. Simpson
Editor
Texas Tech University

This *Journal of Thought* special issue on "Technology Leadership in Education: Social, Cultural, and Pedagogical Challenges" includes six articles and a book review which present a variety of critical perspectives on challenges and opportunities confronting educational leaders in P-12 schools and higher education settings in successfully integrating computer and related multimedia technologies into classroom and organization-wide teaching, leading, and learning. Together they may be viewed metaphorically as panelists offering their complementary, critical, and, at times, contradictory perspectives on some of the most important questions facing educators today. The first four articles in this special issue focus on challenges and possibilities in the P-12 school environment. The final two articles critically examine social, organizational, and policy issues surrounding the growth of technology-mediated distance education in higher education. The book review analyzes the strengths and weaknesses of the Mark Gura and Bernard Percy volume, *Recapturing Technology for Education.*

The first article, "Frustrations, Realities, and Possibilities in the Quest for Technology-Driven Instruction: An Organizational Theory Perspective" by Bob L. Johnson, Jr., examines the challenges of integrating technology into classroom teaching and learning through the lens of literature on schools as organizations. The author describes the organizational context of teaching and learning and discusses teacher-based criteria for increasing instructional efficiency stemming from this organizational view of schools. An argument is made for a more expansive

conceptualization of technology that is wedded to a more informed appreciation of the complexities of teaching and learning contexts and the artistry involved in teaching. Candidly, he claims "I would suggest that would-be reformers hold a set of faulty assumptions regarding schools as organizations and the essence of teaching. Before identifying these assumptions and the implications that follow from them, allow me to provide a context for these by recapitulating my argument." Johnson's thought-provoking and assumption-questioning article suggests that for technology applications to have long-term teacher interest and sustainability in schools and classrooms, instructional technology designers/marketers and educators will need to communicate purposefully to collaborate on the design and utilization of technology-integrated learning tools that work for and in the realities of day-to-day classroom life.

In "Technology and School Leaders: Overdue or Overload?," John C. Daresh provides an historical overview of the tasks and expectations of the role of the campus administrator—from school principals as *principal teachers* through principals as *instructional*, *political*, and *cultural leaders*—as a conceptual frame for understanding the nature of changing perceptions (both among educators and within society in general) regarding the rise in complexity of the school principalship. This rise in complexity has now included the current widely held belief that principals in schools must also be technology leaders. Daresh argues that, while the need for effective administrative leadership in the area of technology in today's schools is readily apparent, there is an even more fundamental need for educators and policymakers to give thoughtful attention to explicating the "How" and "Why" of operationalizing this new role of principal as technology leader. The author suggests that doing so will go a long way towards helping to clarify whether this new role of principal as technology leader is indeed overdue or simply overload. His seasoned inquiry challenges the notion that policymakers and the public can continue ad infinitum to expand the responsibilities of the principalship and asks whether this tendency—expecting principals to perform well all of the duties foisted on them—is partially the reason fewer educators wish to become principals.

In the third article, "Technology Integration in P-12 Schools: Challenges to Implementation and Impact of Scientifically Based Research," authors Lynne Schrum and Kelly F. Glassett review research on the integration of computer technologies by teachers and other educational leaders in the P-12 school environment. Within their review, the authors identify research-based barriers that have inhibited the successful implementation of technology into classroom instruction. Schrum and Glassett frame their discussion within the interrelated contexts of the current call

nationally for Scientifically Based Research (SBR), the continuing impact of the No Child Left Behind (NCLB) legislation, and local school district educators' ongoing struggles to respond adequately to high-stakes testing and accountability pressures while faced with dwindling financial resources. The authors call for an expansion of open dialogue—informed by sufficient information and data generated by researchers and practitioners—among all stakeholders involved (P-12 educators, administrators, students, parents, community members, educational researchers, and policymakers). This dialogue, the authors emphasize, should focus specifically on developing creative ways to work collaboratively and effectively to enhance teaching and learning for all learners. With such dialogue and collaboration, they foresee the emergence of a more effective design and utilization of educational technologies in the future.

In the fourth article, "Multimedia Case Simulations as Professional Learning and Assessment Tools for School Leaders," Joseph Claudet presents a stimulating overview of an externally funded, innovative, and collaborative partnership among university researchers, state-level educational agencies, and P-12 educators to develop and disseminate a series of technology-integrated professional learning and assessment tools for school administrative leaders. The article includes a review of multimedia development activities and interactive design features associated with the technology project. Key findings—relating to the potential of technology-integrated case designs for enhancing the reflective thinking and decision making capabilities of school leaders—emerging from the project research and development efforts spanning a ten-year period are presented and discussed. The efficacy of using technology for the purposes identified by Claudet provide a powerful illustration of why many advocates of technology are excited about present and future uses of the means.

The final two articles in this issue examine issues and challenges emerging within the context of the expanding integration of technology in higher education settings. Pedagogy and implications of policy issues regarding online learning in higher education are examined in "Online Learning: Implications for Higher Education Pedagogy and Policy" by Anthony G. Picciano. He highlights the explosive growth in online teaching and learning that has occurred in many colleges and universities from 1997 to the present. Ongoing advances in broadband connectivity and communications technologies coupled with expanding access to the Internet and the World Wide Web suggest that this robust growth rate in online learning will continue for some time. The article explores several intriguing pedagogical aspects of online teaching and learning in higher education settings, including the fact that more and more faculty and students are opting to embrace online teaching and learning for a

variety of reasons discussed in the article. According to Picciano, these trends "represent a significant shift in the evolution of higher education" that collectively point to the need for policymakers to actively work to understand these trends and to devise appropriate educational policies to address them. For him, the data are clear: the foreseeable trend is that more faculty and students will embrace technologies of teaching and learning. The issues, however, are not all settled, including the need to develop more reflective quality measures for online learning in a world where prestigious universities compete with degree mills for students.

In the final article, "Desperate Technologists: Critical Issues in E-Learning and Implications for Higher Education," Allison Carr-Chellman, from her perspective as a faculty member in a technology field, explores critical issues surrounding online learning (or e-learning) in higher education. The author considers a number of prominent issues informing the e-learning debate—including quality and content, democracy, and efficiency—and examines key features of each issue as espoused by both advocates and skeptics of e-learning. The article raises a number of controversial issues about the long-term future of e-learning in higher education, including how this future may reshape the functions and very nature of university teaching and learning. In raising these concerns, she is obviously pushing readers to think reflectively and evidentially, not ideologically, about if, when, how, and why distance education should be employed and what is gained and lost in the process.

In the final essay, Nelson Coulter reviews Mark Gura and Bernard Percy's book entitled *Recapturing Technology for Education*. He observes that the authors engage the thinking of those who object to the full integration of technology into pedagogical activities as well as the philosophical arguments related to their positions. Among other arguments the authors make is the one that schools and society are at risk if they do not integrate technology throughout their operations, including teaching and learning. The most valued section of the book for Coulter is the portion that devotes considerable time to discussing how technology can be integrated in the pedagogies connected to the various disciplines and the listing of relevant websites for use by educators.

Collectively, the seven essays in this issue on technology leadership in education highlight key philosophical, practical, and technological issues and challenges educational leaders in P-12 schools and college and university environments are facing now and will continue to face into the foreseeable future. It is the intent of this special issue that the perspectives and insights presented by these authors regarding the contemporary landscape of technology integration in P-12 schools and higher education settings will be both thought-provoking and useful to educa-

tors, researchers, policymakers, and others interested in the future of technology leadership in the field of education. To this end, we encourage readers to engage the authors' ideas with their own. Ideally, the interaction of ideas will lead to more questioning. Likewise, we hope that the ideas and questions will lead to a more reflective utilization of technology in P-12 schools, colleges, and universities.

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Frustrations, Realities, and Possibilities in the Quest for Technology-Driven Instruction:

An Organizational Theory Perspective

Bob L. Johnson, Jr.
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Introduction

We are in the midst of a revolution that is transforming society. Much like the invention of the printing press, steam engine, and wireless, the emergence of digital technologies over the past quarter century is altering the institutions of society and redefining patterns of interactions among its members. The evolution and diffusion of these technologies is occurring at a rapid pace, creating—among other things—a knowledge explosion and the demand for labor skills that exceed those found in the current workplace.

As a social institution charged with transferring and making accessible the "funded capital of civilization" (Dewey, 1971) from one generation to the next, public education has not been immune to these changes. The need to ensure that students acquire the knowledge and skills needed for a changing labor market and to see that the nation maintains its competitive edge in a global economy have combined to create demands that schools embrace this technology.

For *techno-reformers* (Cuban, 1996), digital technologies represent the new *Grail* in education. The potential of these technologies for improving instructional and organizational efficiency have increased demands on educators to move toward more technology-driven educational models. Not only are teachers under pressure to acquire skills in computer-based instructional technologies, administrators are under pressure to incorporate digital tools that will enable them to collect an

array of school and student data for school improvement. The expectations associated with these emerging technologies is such that one rarely finds discussions of educational reform that do not argue for increased use of technology and foresee the day when a virtual chicken is found in every pot (Thorpe, 1999).

The potential of delivering simulations, tutorials, and the world's best libraries to the classroom have resulted in significant technology investments across the States (*Education Week*, 2005). Data collected by various agencies reflect this. Whereas in 1985 there were few if any computers found in schools, by 2004 the ratio of students to instructional computer was 4:1 (Fox, 2005). Less than 5% of public school classrooms had access to the Internet in 1994; by 2003, the internet was available to 93% of all and 90% of high-poverty classrooms (NCES, 2005a). In a national study of digital technologies, over 50% of the teachers surveyed reported that the availability of such technology for classroom use was "sufficient" (NCES 2005b). These and other data provide ample evidence of the substantial and increased presence of digital technologies in public education.

Yet in spite of this growth, a fundamental puzzle remains: *the basic approach to teaching has changed little*. Major discrepancies exist between the level technology resources available in schools and the extent to which teachers have actually integrated this technology into day-to-day teaching strategies. These discrepancies puzzle some while frustrating others. With hopes of increasing instructional efficiency through the transformation of the teaching-learning process, technology advocates bemoan the low-end, unimaginative use of digital technologies in schools. Multiple explanations are offered as to why the envisioned level of integration has not occurred. An extensive conceptual and empirical literature identifying numerous obstacles—resource, training, attitudinal, teacher, leadership, bureaucratic, infrastructure, etc.—testifies to this (e.g., see Ertmer, 1999; Fabry & Higgs, 1997; Maddux, 1998).

Purpose

In the context of this debate, my purpose is to offer a perspective and set of factors that explain in part why the full and seamless integration of digital technologies has not occurred in classrooms. The observations which follow are informed by concepts and frameworks found in the organization theory literature. As a sub-field of sociology, organizational theory is concerned with the systematic study of formal organizations (Hall, 2002; Mintzberg, 1979; Morgan, 1986; Scott, 2003; Thompson, 1967). This literature provides a rich set of conceptual tools often ignored in educational research and reform debates.

As the dominant form and venue for social interaction, the formal organization provides a context for understanding a variety of social processes. The numerous activities that occur in educational organizations—leading, teaching, counseling, etc.—take place in an *organizational* context. One cannot talk about these interactions without considering the organizational context in which they occur. Yet a review of the literature on technology integration suggests an inadequate, superficial consideration of this perspective. What is it about *schools as organizations* that facilitates or hinders attempts to move toward a more technology-driven teaching model in the classroom? It is this perspective that defines the thoughts which follow. Drawing from the organizational theory literature, it will be argued that the defining features of schools as organizations: (1) call for a more expansive view of technology as a concept; (2) facilitate, constrain, and shape the work of teachers and the teaching process; and (3) give rise to a set of efficiency criteria that teachers use in making judgments regarding the use of digital technologies in teaching.

Toward a More Expansive View of Technology

An important yet untapped insight that can be gleaned from the organization theory literature is the conceptualization it offers of technology. Whereas technology enthusiasts narrowly define the concept in terms of hardware-software, the organizational theory literature provides a more expansive conceptualization (Perrow, 1967; Scott, 2003; Thompson, 1967). Two primary referents are offered for technology: (1) technology is *the core task* that defines the essence of an organization; and (2) technology is *how* this defining core task is actually done.

The term *core technology* is used in organizational theory to describe the *core task* that defines an organization. For example, the defining task of the Boeing Corporation is aircraft production. The defining task of Wendy's is fast-food preparation. The defining task by which school organizations are known is teaching-learning. While many supplemental tasks can be found in these organizations (e.g., managing, counseling, selling, etc.), it is the core task that defines the essence of each. Schools are defined by the teaching and learning that occur in them. This core technology gives educational organizations their identity and distinguishes them from other types of organizations.

Organizations vary in the level of clarity which surrounds this defining technology. The level of clarity surrounding the preparation of fast food at Wendy's—the degree to which inputs are certain *and* the means of transforming these into outputs are known and predictable—

is much higher than the task clarity that surrounds teaching-learning (Perrow, 1967; Rowan, 1990). At Wendy's there is one best method for making malts. This method has been standardized. By contrast, there is no one-best method of teaching. An instructional approach which works with one student may not work for another. The task clarity of teaching-learning—the degree to which the inputs and effects of teaching can be predicted with certainty—is much lower than that of fast-food preparation.

Task clarity shares a positive relationship with the structural centralization. Core technologies that are clearly understood lend themselves to tighter levels of organizational structure (Thompson, 1967). Conversely, core technologies that are less predictable lend themselves to looser organizational structures. The uncertainties of teaching (low task clarity) call for a decentralized structure (minimal structure) that allows for teacher autonomy and flexibility.

Second, technology is used in organizational theory to describe *how* the defining core task of an organization is actually done. As suggested by its etymological root [Greek: *techne*-art or skill], technology refers to the intellectual know-how, techniques and methods, physical hardware, and sequencing of activities used to *skillfully* transform inanimate or animate materials into outputs (Hulin & Roznowski, 1985; Scott, 2003; Thompson, 1967). Technology, in this sense, refers to *all* of the components and activities noted above *in combination,* not just to physical hardware or tools alone. When conceptualized in this manner, technology is a more expansive concept than that found in the technology literature. Whereas the organizational theory perspective views the technology of teaching as a multiple and varied set of knowledge, judgments, sequenced activities, and physical tools *combined in a skillful manner*, the educational technology literature defines technology in much narrower terms: the physical hardware or tools used in teaching.

Failure to recognize the complexities of teaching as reflected in this more expansive organizational theory view of technology explains in part the overly simplistic manner in which the integration issue has been framed in the technology literature and why it is seen as a "teacher problem." Many techno-enthusiasts fail to understand that digital technology as physical hardware: (1) is but one of many components associated with the technology of teaching, and, as such, (2) exists in relationship with many other technology-of-teaching components. For teachers, transforming instructional delivery using digital technologies represents more than just adding a new teaching tool. It means rethinking and reconciling the relationships shared between this hardware and the other components that define the technology of teaching. It also means determining how *all* can be *skillfully combined* in teaching.

This more expansive view of technology suggests that what is being asked of teachers is more complicated than most techno-enthusiasts realize. Moving toward a digital-technology model of instruction involves a fundamental rethinking of the complex process that is teaching. While most in the education technology literature do not reflect an appreciation for this larger organizational view of teaching and the issues it raises for the use of digital technologies, a handful do (Ertmer, 1999; Ertmer, et al., 2002; Kerr 1996, 1991; etc).

The Organizational Context and Challenges of Teaching

Part of the explanation of why teachers have not integrated digital technologies into teaching at levels advocated by technology enthusiasts focuses on the defining features of the school organization and the fundamental challenges of teaching. To understand the essence of these challenges, one must examine each in the larger context of the determinants of teaching. Two related ideas from the organizational theory literature are offered here in an illustrative way to shed light on these determinants.

What is it that determines how teachers teach? While the obvious answer to this question focuses on the individual teacher and the professional choices made in the privacy of the classroom, this is a complicated question. Teaching choices are not made in a vacuum. Not only is the teacher situated in an organizational context that influences teaching choices, the teacher also faces the realities of instructing a large group of students (Tyack & Tobin, 1994). Both factors define, facilitate, and constrain teaching choices.

The institutional nature of school structure and processes. The organizational structure of schools is as much the product of the hyper-rationalized thinking associated with the scientific management movement as it is of the expediencies of the classroom (Callahan, 1962; Tyack & Cuban, 1995). Faced with the challenge of providing a mandatory education for all, the current school organization was consciously modeled on what progressives of an earlier day identified as the most efficient of all organizational forms: *the factory and batch-processing model.*

Although slight distinctions exist between elementary and secondary schools, the structural and process artifacts of this thinking are familiar to all former students: age-graded student cohorts; the egg-crate organizational structure; the one-teacher–one-class division of labor; the whole-group, textbook-based instructional approach; the multi-period day; 55-minute teaching units separated by a rigid bell schedule; three to four daily preps per teacher; multiple, quick, and, at times, intense individual

student-teacher interactions; extensive paper-work; a detailed student record and tracking system; homework, in-class assignments, tests, and report cards; etc. (Bidwell, 1965; Corwin & Borman, 1988; Willower, 1985) These and other features have come to define for the American public what it means to *do school* (Eisner, 2003; Metz, 1990). Similar to other enduring mythical images that define our national identity—e.g., Disney, Coca Cola, the New York Yankees—these features of schooling have been *institutionalized* in the American psyche (Meyer & Rowan, 1977, 1978). Though many have outlived their usefulness, their imprimatur provides the public with a set of criteria by which qualitative judgments regarding the effectiveness of schools are made.

There are at least three implications for reform and change to be drawn from the institutional character of school organizations. First, the structure of schools and the nature of teaching have changed little over the years. The institutional features of schooling are such an entrenched part of our collective mental furniture that innovations which substantively deviate from this pattern are met with suspicion. Institutionalization has morphed into a cognitive ossification that serves as a roadblock to change and innovation (DiMaggio & Powell, 1983).

Second, the factory model from which the current school structure is fashioned has perpetuated a one-size fits all approach to the organization of schooling (Callahan, 1962; Tyack & Cuban, 1995) *and* an excessively technical-rational view of teaching (Elmore, 1995, 1990; Rowan, 1990). While this model has facilitated educators' attempts to address the logistical and efficiency issues associated with the mandate of educating the masses (a diverse group indeed), it often falls short of facilitating the work done by teachers in classrooms by perpetuating a hyper-rational view of teaching.

As noted above, the core technologies found across organizations vary in the clarity that define them. The level of clarity surrounding the task of assembling a chair in a factory—the degree to which inputs and the means of transforming these inputs into outputs are certain and predictable—is much higher than that of teaching (Perrow, 1967; Rowan, 1990; Thompson, 1967). While a centralized organizational structure is conducive to tasks which exhibit high degrees of clarity, such structures work against tasks exhibiting lower degrees of clarity. The uncertainties of teaching call for a decentralized structure that allows for teacher autonomy. Yet the institutional views of schooling are such that teaching, much like the organizational structure in which it occurs, is seen by the public as a hyper-rational task subject to high degrees of standardization, centralization, and predictability (Johnson, 1997).

It is this hyper-rational myth of teaching that drives much (certainly

not all) of the demand for the increased use of digital technology in the classroom. "After all," advocates argue, "teaching is clearly amenable to automation; and automation can only lead to increased efficiency." Central to this way of thinking is the drive to make teaching an excessively planned and engineered activity. While there are aspects of teaching that are routine and repetitive, many of the uncertainties of teaching elude rationalization. Technology advocates who adhere to a hyper-rational view of teaching are unaware of the fundamental realities of the classroom and the challenges these present to teachers.

The fundamental challenges of teaching. If the institutionalized features of schooling perpetuate a hyper-rational view of teaching, the realities of standing before multiple groups of 30+ students on a daily basis and addressing the contradictory purposes society has for its schools underscore the artistry and skill required of the effective teacher. For example, teachers are expected to not only know *but* effectively convey their subject matter to students. Teachers are expected to cover vast amounts of curricular content *while* cultivating depth and understanding. Teachers are expected to socialize students to conform to society's values *while* simultaneously encouraging independent thought; and teachers are expected to teach all *while* individualizing instruction.

Yet at the heart of the teaching endeavor lie two fundamental challenges that outline the parameters of teaching (Brophy, 2004; Cusick, 1992; Jackson, 1986, 1990, 1992). Both, it would seem, arise from the batch-processing approach that defines American public education. Both provide the focal point of teacher activity. The first focuses on the creation and maintenance of an orderly classroom environment, the second on motivating students to learn. Ongoing efforts by teachers to reconcile and balance these challenges provide the context for understanding day-to-day instructional decisions. Both challenges are mutually reinforcing. Both highlight a defining tension in school organizations (Johnson & Owens, 2005; Muir, 1986; Waller, 1932).

As with other human-service organizations, the relationship between the organization and its clients is of utmost importance in schools (Hasenfeld, 1983). For learning to occur, teachers must maintain an orderly classroom environment. The creation of this environment relies heavily on the quality of the student-teacher relationship. This relationship is complicated by two factors: (1) school attendance for students is mandatory; and (2) the maturity level of students is such that the educational goals and values personified in the school's representatives (i.e., administrators and teachers) are often incongruent with student interests. Simply stated, students are *captive clients* with *immature tendencies* (Carlson, 1964; Muir, 1986). Many students attend school

against their will and, as a result, refuse cooperation. These factors make the creation of orderly classroom environments problematic. As a result, teachers must coax, negotiate, and occasionally resort to "strong-arm" tactics with students. Whether an appeal to the authority-status of the teaching role or to the bureaucratic rules of the school, these impersonal tactics are potentially alienating for students. If used by the teacher in excess, passive student-resistance can easily escalate into overt rebellion. If used with skill, these tactics result in a positive learning environment. The need to establish classroom order is a fundamental teaching challenge.

Teachers must also motivate students to learn. The effectiveness of human-service organizations rests on the cooperative participation of the clients served. In the context of schools, effective learning requires the active cooperation of students. This cooperation requires that the teacher energize and establish affective bonds with the class. Given that teaching is a highly individualized and interactive activity, motivating students to learn is a function of close, warm relations. To maximize the learning experience, teachers must connect or bond with students. While Jaime Escalante and Mr. Holland taught math and music respectively, it was their personalities and belief in students that inspired students.

The irony of these dual challenges is found in the countervailing tensions each creates, tensions that must be skillfully balanced. Whereas the need to establish classroom order rests on the use of impersonal bureaucratic tactics, the need to motivate students rests on the affective, individualistic, and personal appeal of the teacher. In dealing with students, the teacher must behave in ways that are simultaneously *personal* and *impersonal*. This highlights a basic dilemma in school organizations: the need to motivate students to learn (i.e., the need to solicit student cooperation) while creating an orderly environment in which this learning can occur (i.e., the need to threaten and force compliance as needed while running the risk of undermining student motivation). Teachers vary in their ability to recognize and negotiate these challenges.

Reconciling institutional myths and classroom realities. The cumulative effect of these defining features of school organizations is to place teachers in the cross-fire of several conflicting demands. While the institutional features of schools promote a conservative approach to innovations that would deviate from established social patterns, the hyperrational view of teaching perpetuated by these same institutional patterns invites demands for instructional efficiency that belie an understanding of the complexities of teaching (Johnson & Fauske, 2000). Meanwhile, teachers are asked to reconcile these conflicting purposes in the classroom while teaching multiple classes and students. This teaching is expected to

occur in an environment that is orderly, warm, and inviting. It is also an environment marked by a scarcity of resources and time.

Lest it appear that the convergence of these demands in the classroom has resulted in immobilization, teachers have developed a repertoire of coping strategies over the years—a *craft wisdom*—to deal with the hectic rigors of teaching (Eisner, 2002; Shulman, 1987; 2004). These strategies are given expression in the simple yet resilient routines found in most American classrooms. They have proven effective in dealing with large numbers of students in small spaces for prolonged periods of time (Cuban, 1986).

In addition, conscientious teachers have and continue to be in search of more efficient means for managing the fundamental challenges of teaching. This efficiency-search, however, is driven by a more expansive view of *teaching as a technology* that goes beyond any single tool or set of hardware used in teaching. It is an understanding of teaching rooted in the expediencies of classroom life (Cohen, 1986; Jackson, 1986).

Teacher-Based Criteria for Increasing Instructional Efficiency

As a means of coping with the pressures and contradictions inherent in these defining organizational features, teachers have developed a set of implicit criteria anchored in the realities of school life that govern classroom decisions. Using these criteria, teachers engage in a working calculus whereby they identify and assess: (1) what to include or exclude from their teaching; and (2) what larger organizational and environmental forces to include (bridge with) or exclude (buffer from) their classrooms (Johnson & Fauske, 2000; Ogawa, 1996). As an integral part of the teaching culture, these criteria are rooted in a more expansive view of teaching and reflect an appreciation for the complexities of teaching that elude the casual observer (Johnson, 1997). It is criteria such as these, I would argue, that drive the seasoned teacher's search for increased instructional efficiency (Clark & Yinger, 1979; Cohen, 1986). In light of the demanding logistics associated with the batch-processing structure of schools and the conflicting demands placed on teachers, a seasoned teacher might ask: How can I manage the fundamental challenges of classroom management and teaching more efficiently? How will this proposed innovation facilitate or hinder my efforts in doing this?

Contrary to what much of the reform literature suggests, most teachers are engaged in an ongoing quest for increased instructional efficiency. Whether through minor adjustments in the curriculum or experimentation with new techniques and tools, the typical teacher is in search of more efficient ways of teaching. What is misunderstood,

however, is the nature of the criteria that governs this search by teachers and the extent to which these criteria differ from those held by most technology advocates. While many individual criteria could be identified, space constraints dictate that only a few be highlighted here.

The tools teachers have incorporated into their collective repertoire are those that have proven simple, durable, flexible, and cost-efficient in addressing the fundamental challenges of teaching. This implicit yet important set of criteria define what some have labeled *the practicality ethic* of teachers (Doyle & Ponder, 1977) and are rooted in efforts to navigate the rigors of classroom life (Clark & Yinger, 1979; Cohen, 1986; Jackson, 1986). When considering a given innovation or tool, these criteria lead teachers to ask the following: Is it simple to use? Is it reliable and durable? Is it versatile for use across students, classes, subjects, and settings? Can it be used independently, i.e., does its use increase or decrease my dependence on others? Do the benefits gleaned from it exceed my costs in using it? In sum, will it facilitate my efforts to create an orderly learning environment and motivate students? When considering changes or innovations in teaching, it is these criteria that are initially considered by teachers. Digital technologies that fail to meet these criteria have a low probability of adoption.

Cuban (1986) has explored the technological innovations (hardware) embraced by teachers over time. Because of the simplicity, durability, and flexibility they exhibit in meeting daily classroom challenges, innovations such as the chalkboard, textbook, and overhead-projector have remained in the teaching repertoire. Each reflects qualities which appeal to teachers (Jackson, 1986). The efficiency of the chalkboard becomes evident in the way it allows teachers to spontaneously write, erase, and record classroom-generated insights. Likewise, textbooks have proven flexible, durable, and easy to use. Both are superior to more complex technologies in the versatility they display in adapting to the uncertainties of teaching. The learning benefits associated with each exceed teachers' costs in using them.

A second set of criteria used by teachers to assess proposed changes to instructional strategies and classroom routines arises from the *stimulus-overload, labor-intensive environment* that defines school organizations (Hasenfeld, 1983; Willower, 1973, 1982). In the day-to-day life of schools, teachers find themselves subject to several short yet intense interactions with multiple individuals. These interactions occur in an environment characterized by meticulous record-keeping, an over-abundance of paperwork, resource scarcity, and rigid, bell-driven schedule. Every minute of the day is utilized. Facing increasing demands, teacher frustration is often at or near the threshold level.

Managing this stimulus-overload environment in functional and efficient ways is a defining feature of teacher work. Proposed changes in the larger school are assessed by teachers in terms of this environment. How will it affect me? Will it contribute to the stimulus overload I'm experiencing? Proposed changes to instructional strategies and classroom routines are likewise assessed using these criteria. When considering a given change, tool or technology, will its incorporation ameliorate or exacerbate this hindrance level? Will it require more effort, paperwork, and non-instructional time of me? Technologies that increase the hindrance level of educators will not be sustained by teachers in the classroom.

Advocates for the increased use of digital technologies often overlook the implications these have for increasing or decreasing the stimulus overload working environment of teachers. Driven by a hyper-rational paradigm, many fail to grasp the subtle complexities and artistic elements of teaching. As a result, they point to the efficiency gains associated with this hyper-rational view. Access, availability, teacher attitudes, and training, they argue, are the major hurdles to overcome. What often goes unnoticed and/or ignored, however, are the complexities of classroom life that teachers know all too well: How will time be reallocated so that training in the use of these digital tools can occur? What will be deleted from the already crowded schedule to make room for this training? Will a given technology become like other innovations...yet another *add-on* contributing to stimulus-overload? Once start-up costs are addressed, how much time and effort will be required of teachers to ensure *sustained use* of these technologies? While the introduction of novel technologies may be initially met with great excitement, the costs associated with sustained classroom use will quickly temper this enthusiasm. Most teachers are keenly aware of these costs.

A third set of criteria used by teachers to assess changes to instructional strategies centers on the authority structure of the classroom. Changes that buttress rather than undermine the authority of the teacher are more likely to be adopted. Three prominent structural features underscore this authority. First, as densely populated social collectives, schools are structured to control student behavior (Willower & Jones, 1973). Administrative personnel manage students using a variety of crowd-control policies and procedures, e.g., strict policies regarding in- and out-of-class behavior, student assemblies, lunchroom and playground behavior, etc.

Second, attempts to coordinate and control are exacerbated by the unselected and captive nature of students. Because public education is compulsory, many students attend school unwillingly. Much like prisons and other *total institutions* (Goffman, 1961), the unselected and

captive nature of the student population promotes an adversarial relationship between teachers and students. This relationship creates further client-control challenges for schools (Carlson, 1964; Hasenfeld, 1983; Waller, 1932)

Third, the historical role of the teacher as the adult representative and pedagogical expert provides him/her with a level of authority that exceeds that of students. As a result, teachers exercise an array of constraints on student choices. For example, teachers regulate how teaching will occur, the topics to be discussed, where students sit, with whom they talk, when students go to the bathroom, etc. As regulator of the minutest of details in the lives of students, a teacher's control in the classroom approaches total power (Muir, 1986).

These three structural features contribute to a defining norm in the teaching profession: teachers are expected to create and maintain orderly classroom environments. Effective teachers are defined as those who, among other things, consistently demonstrate this ability (Johnson, 1992, 1997). Given the strength and logistical expediencies associated with this norm, digital technologies that facilitate teachers in their efforts to address the fundamental challenges of teaching *without* undermining their authority are more likely to be integrated into classroom routines.

Evaluative criteria such as these—*the practicality ethic, stimulus-overload environment, and classroom authority structure*—constitute the working rubric used by teachers to assess proposed changes to instruction. Not only do these criteria reflect the complexities of teaching, they also reflect the collective response of the teaching profession to these complexities. As part of an accumulated craft wisdom, these criteria are rooted in the hectic rigors of classroom life and arise from the logistics required to address the batch-processing structure of schools. They highlight the extent to which work in the classroom is constrained by the defining organizational features of the school. As noted above, this more complicated view of schools and teaching is often oblivious to those who have never taught. This is reflected in the naivete inherent in the design and marketing strategies associated with many digital innovations intended for educational use.

Implications and Conclusions

So how do these ideas help us understand the frustrations currently experienced by many technology enthusiasts? Can we conclude that, as a group, teachers are defined by a myopia that prevents them from seeing the gains to be realized from digital technologies? The tone undergirding the thoughts articulated above might lead some to erroneously conclude

that there is no place for digital technologies in schools and that teachers will be forever resistant to them. Yet this is not the message that I intend to convey. Lest in making my case I have over-stated my point, I would suggest that would-be reformers hold a set of faulty assumptions regarding schools as organizations and the essence of teaching. Before identifying these assumptions and the implications that follow from them, allow me to provide a context for these by recapitulating my argument.

The purpose of this endeavor has been to offer a set of factors that explain *in part* why the full and seamless integration of digital technologies has not occurred in classrooms. These insights are rooted in an understanding of schools as organizations and, as such, derived from the larger organization theory literature. This literature is often ignored by educational researchers and reformers. First, organizational theory provides a more expansive view of *technology* than that found in the technology literature. The *technology that is teaching* is more than just physical hardware and tools. It is that knowledge, series of judgments, sequence of activities, routines, and physical tools that are skillfully combined to teach and manage the classroom. For teachers, transforming instructional delivery using digital technologies represents more than just adding a new teaching tool. It means rethinking and reconciling the relationships shared between this hardware and the other components that define the technology of teaching.

Key organizational determinants of teaching were also explored. While there are many factors that shape the work of teachers, only two were examined here: the institutional character of schooling and the fundamental challenges of teaching. The institutional character of schooling—that is, what it means in the public's mind to *do school*—is such an entrenched part of our collective thinking that innovations which substantively deviate from this pattern are often met with suspicion. Yet society's batch-processing image of schooling promotes a hyper-rational view of teaching that drives much of the demand for increased digital technology use.

The realities and uncertainties of classroom life as experienced by teachers, however, negate the validity of this hyper-rational view. As personified in the challenge of reconciling the multiple purposes of education, creating an orderly classroom environment, and motivating all students to learn, the realities of classroom life underscore the uncertainties and artistry of teaching. It is these features that define the contours of classroom life and provide the context for understanding the criteria used by teachers to guide instructional choices. These criteria include such things as the practicality ethic, managing the stimulus-overload environment, and maintaining teacher authority in the class-

room. Instructional strategies or tools that fail to adequately address these classroom-rooted criteria are not likely to be embraced by teachers.

While many see these criteria as the basis for criticizing teachers as conservative and resistant to change, labeling teachers as such reflects an inadequate grasp of a much deeper issue. Those who offer such criticism fail to understand the complexities of teaching and the character of the larger school organization in which this teaching occurs. This misunderstanding is reflected in the defining assumption that undergirds much of the technology reform literature: *in order for schools to move toward a more technology-driven instructional model, teachers and the way they teach must change.*

To be sure, there is a measure of validity in this assumption. There are teachers who are unwilling to rethink the what, whys, and wherefores of what they do in the classroom. The sunk-costs associated with the instructional grooves they've created over time are seen as exceeding the benefits of *any* proposed change. The majority of teachers, however, do not fall into this category. As noted above, most are open to innovations that show promise of increasing instructional and classroom-management efficiency, i.e., students acquiring more with the same or less teacher effort. Yet these teachers are keenly aware of the complexities of teaching and what is required to manage the hectic rigors of classroom life in school organizations. What they remain unconvinced of is *how* digital technologies will facilitate their efforts in efficiently addressing these challenges and rigors. If convinced that a given tool will facilitate this effort, teachers are more likely to embrace it. If a digital tool does not facilitate increased instructional efficiency, regardless of the bells and whistles which define it, its chances of becoming a part of the teacher's repertoire decrease. Teachers' widespread use of computers as tools for word-processing, record keeping, and communication provide examples of tasks that are congruent with the defining contours of classroom life. More complex technologies that would increase the stimulus-overload working environment of teachers are not.

In today's digital world, criticizing teachers for not doing more with technology generates much attention for the political opportunist. What is missed by such rhetoric, however, is the more consequential reasons for *why* teachers do what they do in the classroom. Most technology reformers and non-teachers are unaware of these reasons. The technologies they introduce and the solutions they provide reflect a simplistic view of classroom life. The subtle complexities of teaching are, for the most part, oblivious to them and, as a result, are under-addressed in their products.

This highlights for me the somewhat incommensurate worlds of technology developers and teachers. While the animating goal of both is

similar (i.e., the desire to increase instructional efficiency), the working worlds and assumptions of each differ. Technology developers reflect a sophisticated understanding of the realities of the technical world yet a hyper-rational, simplistic understanding of the realities of the classroom world. The profit motive often provides a mitigating incentive to this work. Conversely, teachers reflect a sophisticated understanding of the realities of the classroom world yet an under-developed appreciation for the potential efficiencies to be gained from the technical world. Unconcerned with profits, they are driven more by the search for addressing the pressing day-to-day realities of the classroom.

As a group, those who develop classroom digital technologies have done an inadequate job of soliciting the input of teachers into product designs. Teacher criteria for technology adoption do not appear on their radar screen. Likewise, teachers as a group have been ineffective in communicating the realities of classroom life and its concomitant demands to technology developers. Communication and the cross-pollenization of working assumptions between these groups are needed.

Considered together, these issues suggest a need to redefine the assumption guiding efforts to increase technology use in schools. Based on the organizational perspective offered here, perhaps the more valid assumption is as follows: *In order for schools to move toward a more technology-driven instructional model, these tools must be designed and implemented in a way that is consistent with the nature of teaching and the realities and contours of classroom life.* Categorically speaking, teachers are not unwilling to move toward a more technology-driven instructional model in the classroom. Further, most teachers are not unwilling to reconsider the assumptions that guide instruction. The rapid emergence of digital technologies in society suggests that greater integration in schools will come. However, this integration will not occur at the rate desired by most technology enthusiasts. The organizational perspective outlined here suggests that strategies for increased technology-use begin with the teacher's world, what we know about teaching, and the day-to-day realities of school and classroom life. Digital technologies should be designed and implemented with this perspective in view.

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Technology and School Leaders:
Overdue or Overload?

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Introduction

In their review of the historical development of the school principalship, Beck and Murphy (1993) noted that, in the earliest days of American public education, the role of the campus leader was known popularly as the "principal teacher." This was an appropriate designation, given the fact that the individual school leader was most often the senior classroom teacher in a school who would typically be provided some release time from instruction to allow for the oversight of the building, grounds, instructional materials, and other resources that made up the educational environment for the pupils of the time. Symbolically, it was an ideal designation for a person whose responsibilities were focused primarily on instruction.

The idea for a "stand alone" administrative role for each school did not become common until the first part of the 20th Century. Due to the increase in complexity of individual schools and also school districts, it was no longer possible for an individual to provide consistent attention to work in the classroom. The work of the principal teacher became so focused on the importance of managing the building, budgeting, scheduling, and many other similar administrative duties, that the word *teacher* became disconnected from the job title. Principals as professional administrators became the norm in schools across the United States of America.

In the late 1970s and early 1980s, public and scholarly attention became directed on a significant issue that had been of little interest to educators and community members for many years. By and large, schools

through the first part of the 20th Century were perceived as fairly effective organizations in terms of their ability to provide students with a reasonable foundation in basic skills such as reading, writing, and mathematics. After World War II, however, it became more obvious that there was an expanding gulf between "good" schools and "ineffective schools." Research by Austin (1979), Edmonds (1979), Brookover and Lezotte (1980) and many others noted that successful schools were different from others in large measure because they enjoyed a different style of leadership by their principals. The term "principal as instructional leader" was born, and for the past three or four decades, it has become expected that principals would define their roles not simply as managers of their buildings, but rather as individuals with the skills needed to promote, monitor, direct, and evaluate instructional practices in their schools.

In more recent years, the roles and responsibilities of school principals have again been expanded. Principals are no longer expected only to be competent managers of schools and deeply involved in instructional improvement. They now have multiple duties to perform in numerous aspects of education. In this article, these alternative duties are reviewed, along with the emerging expectation that in some ways, the principal is now also expected to be the "leader of technology" (Creighton, 2002) for his or her school. The broad question addressed through this review of leadership duties is whether or not it is likely that any individual can respond effectively to the multiple expectations of a single role. In these days of diminishing interest in service as educational administrators, it is critical to appreciate the extent to which such potential overload may be driving people away from a critical role in education.

Alternative Visions of Principalship Leadership

As already noted, two popular visions of the role of the school principal have long included the role of the principal as an effective manager and also as an instructional leader. In addition, more recent descriptions of the responsibilities have focused on the principal's responsibilities in the management of political expectations and the need to provide cultural leadership in schools. Of greatest relevance to this paper is the final vision of the principal serving as the school leader of technology.

Principals as School Managers

Throughout much of the history of education in the United States—particularly in the past hundred years—has been the view that schools need someone to manage their daily activities. Principals have tradition-

ally served in that capacity, with duties in such areas as building oversight, budgeting and managing the school's finances, scheduling, coordinating activities, student discipline, and many other responsibilities which, in essence, could be defined as actions that enabled teachers to carry out their instructional duties without the need to be "bothered" by the traditional "three B's of school administration," that is, "beans, busses, and budgets." This perspective of school administration was derived in large measure from the prevailing managerial philosophy in vogue at the beginning of the 20th Century, namely Scientific Management (Taylor, 1916). This perspective suggested that organizations would be most effective in cases where a clear delineation of duties existed for members of any organization. Specifically, managers were employed to administer organizations, while all other employees were assigned the task of carrying out what administrators and managers told them to do. In schools, teachers taught, while administrators told teachers what and how to teach, and also kept the school "business" orderly each day so that the "workers" could devote their full attention to what was assigned to them.

This was a very simple way to define the role of school principals, and relatively easy for principals to carry out. It was demanding work, to be sure. The responsibility for effective financial management, for example, is certainly not something to be taken lightly. And if school finances are not available, schools cannot operate—effectively or not. Preparing people to perform the managerial role of principals was a highly teachable action. Future principals needed exposure to rather traditional managerial skills such as personnel management, finance, law, and how to oversee grounds and physical facilities. Not surprisingly, these skills formed the foundation for the majority of university programs intended to prepare individuals to become school principals for the majority of the last century.

Principals as Instructional Leaders

Almost predictably, a different image of the role of effective principals emerged during the last 20 years of the 20th Century. The previous image of the principal as a manager did not disappear, but it was generally recognized that simply keeping a school orderly did not necessarily result in effective student learning. In the corporate world, this shift from strict management to successful leadership is best characterized by the view shared by Bennis and Nanus (1985) who noted that "managers do things right, while leaders do the right things." Suddenly, effective budgeting and scheduling were not the defining duties of school principals, although they remained traditionally assigned tasks for all who were in charge of individual schools. Now, however, it was understood that, in essence, principals had to return to a previous era in their development and

become more active in direct contact with the instructional part of schools. They had to move toward the image of "principal teacher" more.

Once the notion that effective schools were those led by principals who were "instructional leaders" became an accepted axiom in education, the prevailing image of what principals were supposed to do shifted away from scheduling, balancing budgets, and so forth. Schools went so far as to change the titles over their campus administrators' doors to read "Instructional Leader" rather than the passé "Principal."

A major problem that has always been part of the effort to describe principals as instructional leaders is the precise nature of what the construct of instructional leadership means in practical and concrete terms. For example, is an instructional leader a principal who still teaches classes each day, in the manner of the traditional British headteacher? Or, does the instructional leader stay away from the administrative offices of her or his school each day, opting instead to visit classes and observe teachers? Perhaps the instructional leader avoids all mundane administrative tasks so that his or her time can be devoted exclusively to demonstration teaching and other forms of staff development.

Despite the amount of discussion about instructional leadership, little has been done to define the concept operationally. Few studies have been undertaken to determine the specific behaviors of administrators who are judged to serve as instructional leaders. Early efforts tended to define leadership behavior in very narrow terms, resulting in descriptions that focused only on the ways in which principals became directly involved in instructional activities. This view has generally been rejected for at least two reasons. First, individuals other than principals also engage in activity that may be defined as instructional leadership. Second, instructional leadership can take forms that go well beyond direct intervention in classrooms (Jensen, 1989; Weber, 1989). A definition suggested by Ching-Jen Liu (1984) is useful: "Instructional leadership consists of direct or indirect behaviors that significantly affect teacher instruction and, as a result, student learning" (p. 33). Patterson (1993), in a study for the Association for Supervision and Curriculum Development, noted that instructional leaders appear to demonstrate certain behaviors:

1. They provide a sense of vision to their schools
2. They engage in participative management
3. They provide support for instruction
4. They monitor instruction
5. They are resourceful

University preparation programs have seemed incapable of identify-

ing what this expectation for principals will be in the future. At best, developing expertise in instructional leadership has typically resulted in one or two courses being added in such areas as curriculum development, research on teaching effectiveness, or simply changing the titles of some traditional courses to include the words "instructional leadership."

Principals as Political Leaders

Despite the frequently stated belief by many educators that "education should be apolitical" (Wirt & Kirst, 1972), few would deny that a sense of political reality is critical for anyone who works in a classroom or an administrative office of a school. Political sensitivity deals with an appreciation of activity both within the school as well as in the larger community surrounding all schools. This political reality has been a part of American public education virtually since public education became a part of the landscape of this country, and school teachers and administrators have dealt with this fact for years.

The need for school leaders to engage in even more political activity has become even more pronounced in the past 10 to 15 years. In essence, the current political issues faced in schools came from a general sense of malaise experienced by the public. Numerous groups in private industry and other groups with considerable power and influence in politics have seemingly launched hundreds of statements and reports suggesting that American public education has done very little to address the learning needs of children for many years. It has become common to read statements from representatives of Fortune 500 companies noting that graduates of public schools regularly look for employment without fundamental skills in reading, writing, and mathematics. In short, the general consensus among many today seems to be that American education is not serving the economic and social needs of this country well. As a result, numerous reform measures have been proposed in recent years to "solve" the problems now faced in schools. Among these have been voucher plans, open enrollment programs, decertification of teachers and administrators, prayer in schools, and decentralized management schemes to enable parents and other community members to become more actively involved in the operation of public schools. If any single attitude might be suggested as reflective of public perceptions of schools today, it is one of significant loss of faith that schools are effective.

With such powerful emotions present in the population of the country, it is no wonder that politicians have quickly responded with so many efforts to ensure that they will be committed to "fixing" public schools. The strategy proposed to solve the ills of schools has been an increase in making certain that taxpayers are, in effect, getting a

reasonable return for their money. It is a tempting proposal with great popularity when elected officials, from local mayors through the President of the country, make pointed demands for educators to be held accountable for their work with students, suggesting that, if students are not learning, schools will be closed and educators will be blamed for their malfeasance. At the national level, "No Child Left Behind" has become the focus of schools and a topic of heated dialogue among educators on a regular basis.

The movement toward greater accountability in public education has caused the principalship to go through yet another period of redefinition, this time as a way to transform the role into one that is defined by political leadership. Here, the principal takes on the role of a person who must deal with the politically-defined expectation that schools, as public institutions, must find ways to prove their value, defined largely as the ability to provide effective instruction and increased achievement on the part of students. Now, the principal adds to his or her list of duties the need to be able to work effectively with data, and then present the school to a variety of stakeholder groups that go well beyond the notion of school communities being comprised almost exclusively of students, teachers, and parents. Now, the principal must engage actively with legislative bodies, community groups, political action groups, and many others who now express greater interest in education.

Principals as Cultural Leaders

Added to all of these assorted expectations for the principal is yet another set of duties. Now, the campus leader is expected to take on the role of a cultural or moral leader who will bring about important change to reflect the desired goals of society (Block, 1989; Greenleaf, 1977; Hodgkinson, 1991).

With regard to the principal's role as cultural and moral leader, there is increasing recognition that it is not sufficient to believe that leaders are simply those who bring about organizational change or conform to the demands of diverse political bodies. There is an assumption by many (Barnett, et al., 1990; Hodgkinson, 1991; Sergiovanni, 1990) that a key feature of a principal's role must be to promote change toward morally and societally redeeming goals. An understanding of leadership in these terms is highly dependent on the acceptance of a clear vision of the nature of education. Hodgkinson (1991) noted the following:

> Education is not the art of training and subjugating people to serve at the profit of others. It is the art of helping people to know themselves, to develop the resources, judgment, and skills of learning and the sense of values needed on facing a future of unpredictable change, to understand

> the rights and responsibilities of adults in a democratic society and to exercise the greatest possible degree of control over the won fate. (p. 16)

As a consequence of this new set of expectations for effective performance of the role of the principal, the leader must now become more actively involved in such issues as the promotion of the rights of children as future participants in a democratic society, attention to the needs of increasingly diverse learning communities, and the strengthening of efforts to serve the needs of bilingual education and special needs populations. In short, the traditional and simple vision of a principal simply being a teacher who is also called upon to manage a school building has now become a view that holds that effective principals must become curriculum, instruction, and testing experts, politicians, and architects and cultural guardians. The job has become more difficult with each set of new expectations for what schools are supposed to do.

Principals as Technology Leaders

In recent years, there has been an assumption that principals of schools need to be leaders in the use of educational technology. Like most other assumptions and assignations related to what principals should do as part of their jobs, this assumption seems based on nothing more than a belief that, because technology has become such a pervasive part of our daily lives, so should it be a central duty of someone in the important role of principal teacher in schools. In short, students will not have a full and rich education without being able to develop competence in the use of computers and other forms of technology, in much the same way that the public has assumed that being educated required at least minimal competence in reading, writing, and mathematics. Considerable discussion could easily take place at this point to debate whether or not the use of technology is indeed a foundation of anyone's education, but it cannot be easily denied that, in an age of high technology, it would be difficult to navigate life very effectively without at least some technology skill.

What does it mean for the principal to take on the new duty of being the leader of educational technology? The answer to this question is not immediately clear, but there are certainly some distinct clues as to what leadership might mean in the minds of most observers. At the risk of reaching premature closure on a topic that will no doubt continue to grow in scope each day as new technology is created and potential applications are identified, it seems that, at present, there are certain clear, broad areas in which it may be reasonable to assume that the principal of a school might indeed need to participate in one way or another: increased communication skill, managerial applications, presentation and informa-

tion processing, and, finally, improvement of instruction to increase student learning.

Increasing communication. Less than 25 years ago, school administrators known for promoting effective communication in their schools and with surrounding communities had relatively few sophisticated resources to assist them in this critical area. A good typewriter or a skilled secretary and plenty of memo paper, a regular school newsletter sent out to parents, and a telephone served as the foundation technologies to be used to communicate what the school was doing to the outside world. An open door for parents and community members, a telephone answered reasonably quickly and pleasantly, and quick response to letters represented what the school administrator needed to receive the concerns and questions of the community. Inside the school, a public address system and perhaps two-way radios to contact assistant principals and other key personnel served as the most advanced forms of technology designed to increase intraorganizational communication.

Things have changed. Radio contact between the principals and certain staff members still remains a key to dialogue in most schools. However, high tech has enabled schools to contact those outside their walls through e-mail, the effective use of websites, parent information telephone messaging systems, and even cable television shows that highlight the school's actions to the community. And parents use e-mail and make frequent calls to the cell phones of administrators and teachers to learn about student progress and school programs. Memos and newsletters are disappearing as the computer becomes an ever-increasing visible sign of open communication in homes, offices, schools, and other sites across the world. Technology allows nearly instantaneous responses to questions, and enables school leaders to communicate rapidly-changing information to teachers, students, parents, and community members.

Increased managerial applications. The most obvious place where technology today has resulted in change in the life of school administrators is in the area of management applications. Not too far in the past, building budgets were kept in handwritten logs, student grades and other confidential information were kept in books locked in the school vault, daily attendance was recorded each day by the school attendance clerk, and many other aspects of keeping track of supplies, books, materials, teacher attendance, and most other aspects of record keeping in schools were done by hand. Now, technology is used to not only keep records, budgets, and inventories, but also safeguard these pieces of data in ways that prevent breaches of confidentiality and other abuses that often plagued past practice.

Of all the managerial applications of technology, the one that may be

the most important today is the ability to easily access and manage student performance data on a regular and frequent basis. Data concerning the progress of students toward course goals and achievement benchmarks can be monitored relatively easily by any principal. In the past such review might have been feasible only after specified marking periods where grades were turned in by teachers, or after standardized achievement test data had been returned to the school. Technology now makes it possible to quickly disaggregate data to see how well one group of students is proceeding toward achievement expectations, as contrasted with other groups in the same school or district.

The greatest managerial advantage of modern technology may be that it presents principals and other school leaders with the opportunity to engage in true data-based decision making (Kamphaus, 1993; Snyder, 2000).

Presentation and Information Processing. Advances in technology can be used to make life in schools more interesting and even entertaining (Holland, 2001). Most teachers traditionally dread the thought of lengthy faculty meetings in boring rooms with boring presenters. Technology, if used effectively, can make meetings more endurable through the use of Powerpoint material, multimedia presentations, and even interactive presentations that enable teachers to engage in active dialogue with colleagues in other schools and countries. The days of overhead projectors, chalkboards, and flipcharts may be over in many school systems.

Improving instruction to increase student learning. Finally, the most important potential application of technology may be found in the fact that it may be the source of considerable assistance to students as they proceed through their schooling experiences. Students using the internet can have easy access to more information than most traditional school libraries could ever hope to provide. Computer tutorials are available to students who need further help with learning difficult concepts addressed in regular classes. Course information can be presented in ways that will capture student interest. Properly used, computer-assisted instruction can enhance teaching effectiveness of excellent teachers, and increase the learning experience for most students. Specifically, the use of instructional technology can have great benefits for students with learning disabilities or for students for whom English is not a primary language.

Students can also monitor their own progress in learning important instructional objectives. Through their use of computers each day, it is possible for students, regardless of age, to understand how effectively they are meeting the standards that have been established at each grade level and in each curricular area. It is possible, therefore, for technology

to help learners acquire a most important skill in effective learning—they can take personal responsibility for their own education.

So What Does All of This Mean?

At the start, we noted that principals have been expected to increase the breadth and depth of their knowledge and responsibility with regard to what takes place in schools. It is no longer sufficient for principals to merely manage unruly student behavior, make certain that the schoolhouse roof does not leak, and that the school's finances are kept in line with the district's budget. We noted that, in recent years, the management expectations for principals have remained at a high level, but new demands have been placed on building leaders. Instructional leadership, an idea some have described as increasingly meaningless because it represents little in terms of specific behavior, knowledge, skills, or dispositions expected of effective principals, still has great power. If for no other reason, it marks the fact that principals are educators—they remain part of the instructional teams of their schools. Political realities that face schools are, to be certain, stressful for teachers and principals. But they are understandable from the point of view that the public cannot afford to continue to pay for schooling without demonstrable results. Although one may not agree with the underlying premise of many politicians that "all public schools are failing," or that "we need to destroy all past practice of public education," one cannot argue with the notion that no school is so perfect as to not require improvement and reform. Though we pronounce phrases such as "I believe that all children can learn" with great ease, the fact is that, over the years, many children did not learn.

The importance of principals serving as advocates for social justice and democracy in learning is not really a novel idea. Good principals have long known that their duties are not simply to buy books and fix broken desks. There is, as Sergiovanni (1990) and many others point out, a great need for leaders to stand for moral and ethical behavior. In fact, if leaders only espouse but then do not also model these behaviors on a daily basis, one might easily question whether they are leaders in the first place.

Now, let us return to the driving issue identified at the beginning of this paper. It is clear that expectations for principals of schools to reflect expertise in and model commitment to the effective use of technology are real and present in today's schools. It is highly unlikely that anyone who eschews the value of technology openly will be selected to serve as a school leader, particularly with the general notion that students of today "must have" the opportunity to acquire much more than passing knowledge of technology. The public, as represented by politicians, business

leaders, parents, and many others, is quite certain that technology is truly the wave of the future that will drive effectiveness in the future.

After having noted these realities of the need for school administrators to demonstrate skills and expertise in the area of instructional technology, the nagging questions of "Why?" and "How?" still remain. Simply stating that good principals need to demonstrate awareness of technology is not enough, yet even such sources as the National Board for Policy in School Administration, the Interstate Leadership Licensure Consortium (ISLLC), the Council of Chief State School Officers, and departments of education in numerous states can offer no more guidance regarding the need for technology than the only statements included in ISLLC Standards that suggest what competent school administrators need to know, believe in, or do:

> (Standard 3) The administrator has knowledge and understanding of...current technologies that support management functions.
>
> (Standard 2) The administrator has knowledge and understanding of...the role of technology in promoting student learning and professional growth.
>
> (Standard 3) The administrator facilitates processes and engages in activities ensuring that...there is effective use of technology to manage school operations.

At best, these statements might be classified as weak and with little offer of definition for the school leader desiring to address critical issues facing children in school. The first statements simply indicate that effective administrators would have a certain degree of knowledge about technology, while the third statement above suggests only that a principal might find someone else on his or her staff to oversee the use of technology in the school. None of what the administrator reformers seem to say offers much guidance to the school leader who is already responsible for management, instruction, the school's culture, and political pressures. It may be relevant to note here that, for many reasons, fewer and fewer educators are currently expressing great interest in pursuing the challenges of the principalship in the future, despite the fact that a national shortage of principals is already with us. One of the detractors to those who might have an interest in service as a school administrator is that they see the variety of competing demands on individuals in the role of principal at present and wonder seriously about the value of pursuing a career path that will continue to make strong demands on individuals without much help of relief in the immediate future.

The second major issue facing the efforts to ensure that technology

is effectively addressed by the school leader is found in the question, "How?" How can principals address the multiple expectations of their job and satisfy the public's demands for satisfactory performance in all the areas we have reviewed here? How can people, who at least at this point in the evolution of technology expectations for principals, be retrained to fit into a new world of technology? Many administrators now come from a generation of educators who were never exposed to the importance (real or imagined) of computers and other forms of instructional technology in their work when they were first trained as educators.

How can we assume that all good principals would necessarily have the personal interest or expertise to make use of technology as part of their world of work? There are many successful school leaders to this day who are not tuned to the joy of searching the web or reviewing their e-mail as part of their daily routines. These people are not obstinate or stupid. They simply have different ways of addressing the same tasks and challenges without cell phone, laptop computer, or any other part of equipment supposedly needed by every effective 21st Century leader. Others simply do not feel comfortable or enjoy using the technology that is so available today. Believe it or not, there are effective principals who still prefer to send letters through the regular post rather than via e-mail! Is there to be no further value in administrators who lead through instinct, "gut feelings," or pure artistry rather than fail-safe data based information?

While there is an abundance of quite useful and potentially helpful high tech items and gadgets that may make a great difference to the work of administrators, one also has to realize that there is also a great deal of faddish junk on the market (Pierson, 2005). How will school principals and others be encouraged to make wise decisions regarding important tools as contrasted with momentary fads?

Finally, how will society in general react when, at some point in the future, there is a recognition that, despite the spending of literally billions of dollars on efforts to transform schools and educators into effective users of the latest technology, Johnny (or Mary, or Esteban, or Mohammed, or any other child at any grade level) still cannot read? Will that signal a wholesale expectation for principals to "quit playing with computers and get back to their role as managers again?" We may simply have to wait and see.

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Technology Integration in P-12 Schools:

Challenges to Implementation and Impact of Scientifically-Based Research

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Introduction

Currently our schools exist in an environment that demands accountability and evidence based performance. In the area of educational technology, hardware and software have been in our schools in substantial concentration for almost two decades, and considering the heavy investment required to put it into schools, it is important to base its implementation and use on proven best practices. The body of usable research currently available, however, is scant and scattered. To date there have been few documented systemic increases in student achievement and learning that are directly attributable to technological innovation. The high expectations for improved student achievement have largely been due to extraordinarily high hopes and due to the massive, ongoing expenditure on providing a low computer-to-student ratio and connectivity to the Internet. The potential for educational technology to revolutionize education has been described repeatedly and yet the promise has not been delivered (Conlon & Simpson, 2003; Cuban, 2001; Sandholtz, 2001). The most recent report on this subject by the U.S. Department of Education concludes:

> We have not realized the promise of technology in education. Essentially, providing the hardware without adequate training in its use—and in its endless possibilities for enriching the learning experience—meant that the great promise of Internet technology was frequently unrealized. Computers, instead of transforming education, were often shunted to a

> "computer room," where they were little used and poorly maintained. Students mastered the wonders of the Internet at home, not in school. Today's students, of almost any age, are far ahead of their teachers in computer literacy. (U.S. Department of Education, 2004, p. 10)

This article is intended to identify the barriers to implementation of technology for instruction in our classrooms, by examining the literature. It also seeks to create a dialogue among members of our community for the purpose of identifying a more proactive research agenda. Two forces are currently challenging our traditional research in the field of educational technology. At the national level, past research has been examined closely in an effort to determine if the enormous expenditures have been worth the costs. Overall, our community has helped understand the complexity of the challenge, and yet, we continue to ask some of the same questions.

At the same time, certain types of research are currently required from our community, and it is possible that this model may not allow us to answer the lingering questions of our field. To gain an understanding of researchers' response to the current demand for scientifically based research (SBR), data were gathered from researchers in this field. Finally, this article calls for the development of a proactive research agenda.

Theoretical Lens

It is important to begin with a theoretical lens through which to think about implementation and the effort and energy required to integrate technology into curriculum and activities. Fullan (2001) guided our conception about the challenges to changing educational practice. His notion of a complex, non-linear, and difficult process included three stages: initiation or adoption, implementation, and continuation or institutionalization. It is important to recognize the culture of most schools, in which individual teachers are free to choose from a wide range of teaching practices, unless a systemic effort is underway to infuse technology into the school environment. Additionally, Fullan suggests that teachers as learners require time to gain knowledge and then weave that knowledge into what they know and do in their instructional lives. Further, McLaughlin's (1991) research on staff development described the reality that each teacher responds to many elements in the school, including students, goals, norms, etc. With these thoughts in mind, we examined literature on the challenges of technology implementation for teaching and learning.

Challenges to Implementation

The research into the uses and challenges to integrating technology

in our P-12 classrooms and curriculum has been extensive and yet it appears researchers continue to ask the same questions, struggle with conceptualizing appropriate research models, and report findings similar to those from other studies (Pollard & Pollard, 2004-05). In a meta-analysis of over 600 studies on ICT in education, Lagrange, Artigue, Laborde and Trouche (2001) concluded, "Research struggles to tackle the complexity of the integration of the evolving technologies" (p. 122). In 2003, Roblyer and Knezek (2003) outlined the topics and issues as they relate to theory on which "new research should focus"(p. 60) and Strudler (2003) questioned the strength of the authors' statements surrounding theory and research in technology in education, yet it seems little has changed since this exchange. This ongoing challenge in conceptualizing research questions has consistently plagued the field (Pollard & Pollard, 2004-05; Roblyer & Knezek 2003; Strudler, 2003). This section begins with a review of the most frequently cited barriers to implementation and then examines the most recent research in this area.

One effort to organize and characterize the research was undertaken by the Center for Applied Research in Educational Technology (CARET), a joint project between the International Society for Technology in Education (ISTE) and Educational Support Systems (ESS). An analysis by CARET's researchers demonstrated,

> Much of the research available and examined by CARET is descriptive and based on surveys, interviews, and ethnographies and case studies. Although the educational significance of what was discovered in many of these studies is emphasized, the research methodologies and statistical treatment fall short of what is demanded by NCLB. On the other hand, there are methodologically rigorous studies in which the use of appropriate statistical methods demonstrates that large groups of students using computers or video significantly, in the statistical sense, outperformed their randomly selected control-group counterparts. The difficulty with many of the statistical studies is that they do not provide a sufficient basis for consumers (e.g., school districts) to evaluate the educational relevance of the results. (Cradler, Cradler & Clarke, 2003, p. 51)

Many research studies have repeatedly found that common issues present challenges to implementing technology in curricular and integrative ways. These include inadequate funding, access to equipment, lack of time, and comfort or knowledge about the technology (Hardy, 1998; Lam, 2000; Sandholtz, 2001; Schrum, 1999; Simonsen & Dick, 1997). In general terms, the literature offers little support for the popular rhetoric about technology revolutionizing teaching and learning or teachers fundamentally re-working their lesson plans and pedagogy (Cuban, 2001). As early as 1995, Goodson and Mangan found "evidence of reshuffling the

pack of cards, but little evidence of anybody trying a new game" (Goodson & Mangan, 1997, p. 119).

In 1999, Schrum described the results of surveys of teachers' use of technology as resulting in "contradictory" information (Schrum, 1999, p. 84), and in 2000 the National Center for Educational Statistics found that less than 20% of current teachers reported feeling comfortable and prepared to integrate educational technology into classroom instruction (NCES, 2000). Although the availability of computer technology in schools has increased rapidly in recent years, national surveys of teaching practices show that a small percentage of school teachers use computers to teach concepts during (mathematics) instruction (Weiss, 2000). In one study (Kupperman & Fishman, 2001-2002) an online project was designed to completely transform collaborative activities. Unfortunately, they found

> . . . little evidence of this happening in the LAB project. Original plans included activities where students shared data and responded to each other's conclusions from home, but enactment difficulties led to these activities being stripped down until they were simply traditional assignments that happened online. (p. 209)

Teachers' use of technology may also vary widely depending on the grade level or content. Burton (2001) found that most high school art teachers use technology to make handouts and keep grades and only about half use the web to find instructional materials. Barron, Kemker, Harmes, and Kalaydjian (2003) found, in a large-scale study on technology in schools, that elementary teachers used computers more frequently than middle or high school teachers (29% to 23% and 20% respectively). Sandholtz and Reilly (2004) investigated one school district that focused on curriculum rather than technical skills and concluded,

> Our research offers a paradox for furthering the use of computers in classrooms—if we take away expectations for technical skills and allow teachers to focus on developing curriculum, evaluating learning materials, and thinking about how to provide better learning opportunities for their students, teachers are likely to use technology more effectively and creatively in their teaching. (p. 487)

Teachers' Attitudes. Another significant aspect involves attitudes and beliefs, which appear to play an important role in what teachers do in their classrooms. "Every teacher has a theory. Even the educator who cares only about practical strategies is operating under assumptions about human nature. ... These assumptions color everything that happens in classrooms" (Kohn, 1996, p. 1). Teachers' technology beliefs are influenced by their teaching philosophy. Resistance to adopting new

technologies stem from teachers' existing teaching beliefs (Norton, McRobbie & Cooper, 2000). Moreover, Bitner and Bitner (2002) found that teachers' attitude toward using information and communications technologies within their classrooms was also the key factor in integration.

> Simply put, it is a teacher's criterion for determining whether or not a reform initiative is (a) worth the time and attempts, and (b) feasible within the particulars of the teaching situation. More importantly, teachers may not be buying into what has been termed the mythologizing language that often accompanies technology advocacy. (Delacruz, 2004, p. 8)

Ertmer (1999) suggested that teachers change their practice based on their beliefs about teaching, but also based on first order barriers (incremental, institutional) and on second order (fundamental, personal) "barriers that hinder teachers' technology implementation efforts" (p. 48). She went on to suggest that teachers, who undoubtedly will face multiple barriers as they begin to implement technology into their classrooms, must have "practical strategies for circumventing, overcoming, and eliminating these barriers" (p. 59). In an evolving discussion by teachers regarding the changes needed for technology to be fully implemented in schools, Norum, Grabinger, and Duffield (1999) found four significant themes. Teachers felt that teacher identity (including role of the teacher and the student-teacher relationships) have to be made more clearly defined; administrative support was essential, including time to reflect on the impact of the technology; a need for a relationship with the "outsiders" of a school who made decisions for them (school board members, for example); and the need for others to understand that the adoption of technology is a significant challenge.

Yerrick and Hoving (1999) studied two groups of science teachers in a two-year science, mathematics, and technology education project. They found that the teachers' attitudes towards colleagues, school, and the nature of the technological innovation influenced teachers' implementation, and also that their perceptions of their environment and support (although all teachers had the same support) appeared to influence their implementation of the project. They concluded: "Our findings support the claims of other researchers that attitude, social support, and perceived behavioral control affect the prospects of long-term technology implementation" (p. 305). Bahr, Shaha, Farnsworth, Lewis, and Benson (2004) summarized,

> The effective introduction of technology into instruction represents a struggle similar to those with which the Wright brothers and their contemporary competitors grappled. Among the more important factors

> is the importance of the attitudes of teachers toward seeing ways in which technology can assist in instruction, and then leveraging that positive attitude toward incorporating technology into instruction. If teachers and future teachers do not have positive attitudes toward the usefulness of technology in instruction and toward actually using technology in instruction, then even the best systems and methodologies will remain unused. (p. 89)

It is equally important to consider the role of constructivist teaching practices as part of this equation. Recent research (Ertmer, Gopalakrishnan & Ross, 2001; Rakes, Flowers, Casey & Santana, 1999; Windschitl & Sahl, 2002) has strongly suggested that a positive relationship exists between increased technology integration and the use of constructivist teaching practices. After an extensive examination of technology use in improving students' learning, Wenglinsky (2005) concluded that technology by itself is not good or bad but it all depends on how it is used by educators. "If used in a constructivist fashion, it is a useful tool; and if used in a didactic fashion, it is worthless, or even destructive, burying students in the "drill and kill" model..." (pp. 9-10).

Another influence that compels teachers to use technology may be the requirements of their supervisor or, put more simply, humans do what is expected and what is rewarded. As with all of us, teachers may use technology if they are required, but not necessarily for curriculum–related purposes. In a study of secondary teachers' use of technology, Wilson and Notar (2003) found that the teachers used their technology primarily for documentation of grades, and that many of their principals required teachers to submit their grades electronically. Other significant uses of technology were to search for information for lessons and the creation of documents (handouts, worksheets, and quizzes), but few teachers used the technology for presentation of instructional materials.

> Our challenge is to convincingly demonstrate how to engage new technologies in authentic ways that accommodate teachers' values, work conditions, time constraints, and school cultures. Until these kinds of things happen both in our academic discourse and in our own practice of teaching teachers, many of our claims about the potential of technology will remain an unmet promise. (Delacruz, 2004, p. 17)

Teacher Preparedness. Some research (Boling 2005; Howland & Wedman, 2004; Koehler, Mishra, Hershey & Peruski 2004; Zhao, Pugh, Sheldon & Byers, 2002) "has revealed that teacher educators do not always have the knowledge, skills, or dispositions necessary for meaningfully integrating technology into their classes in innovative and transformative ways" (Boling, 2005, p. 1). Thus, it is important to determine what

educators need in order to be prepared to use technology in an effective and appropriate manner.

> Despite studies documenting the effectiveness of technology to support student learning, barriers to technology integration have been identified. For example, the issue of preparedness of teachers to respond to the influx of technology resources, and of schools to keep up with the mechanical functioning and maintenance of equipment, was one major barrier. (Staples, Pugach & Himes, 2005, p. 286)

Laffey and Musser (1998) found that teachers in training usually do *not* appreciate the power of technology in instruction. Persichitte, Caffarella, and Tharp (1999) and Stuhlmann (1998) discovered that an appreciation for the instructional use of technology is gained following fieldwork that includes a technology component. Sherry (2000) and Powell and Lord (1998) reported that attitudinal changes result from technologically supported field placements. Schrum, Skeele, and Grant (2002-03) found that support for implementation with preservice teachers was required from all levels of activity, including policy makers, administration, and individual educators with whom they work. Perhaps the notion of professional development at both the preservice and inservice levels needs to be revised to include less formal "just in case" workshops, and more "just in time" access to informal activities. Stevenson (2004-2005) found, in a study of teacher informal collaboration about technology, that educators preferred informal discussions to more structured professional development. She stated, "Informal collaboration appeared to provide immediate assistance, addressing specific problems or projects, through the eyes of another educator" (p. 133).

Carvin (2000) suggested that designated funds toward professional development on technology should be close to 30%, but unfortunately was as low as 3% in some districts. In one effort to promote educators' use of technology in constructivist learning styles, the result was that the "actual nature of learning these new technologies in an online format may have interfered with their ability to apply them to their teaching situations" (Marra, 2004, p. 411). In another online effort designed to raise concerns about using technology through participation in an online graduate course, Liu, Theodore, and Lavelle (2004) found that these educators' concerns and interests were uniformly increased and suggested that online professional development may turn out to be less costly than more traditional training directly aimed at technology enhancements. In a large study of art teachers, Rogers (1999) found that those with fewer skills and less experience using technology in their curriculum and instruction identified more barriers, and that those barriers

tended to be both internal (teacher attitudes or perceptions) and external "availability and accessibility of hardware and software, the presence and availability of technical personnel and institutional support, and a program for staff development and skill building" (p. 7-8). She found the barriers that crossed over into both categories were "lack of time and funding" (p. 8).

Other issues. Wetzel (1999) suggested that "lack of teacher time is the greatest" barrier to technology implementation (p. 4). He also suggested that lack of hands-on staff development, support for release time, and teacher empowerment are factors as well. He explained that teaching is the only profession in which "official training time" is not provided for its workforce, as many teachers are expected to attend workshops after school hours (p. 9).

Another issue that may affect teachers' use of technology concerns the digital divide: "Failure to provide adequate technological resources for all translates into failure to provide quality education, creating an even greater divide between affluent and poor school districts" (Mason & Dodd, 2005, p. 26). In a classroom in which many students do not have a computer or other technology at home, these students may be less prepared to use the technology and certainly school assignments that require technology use would not be a possibility. Thus, schools may be the place to learn about technology. "For those students without a connection at home, schools are the primary source of computer access and often the only place they can go online" (The Children's Partnership, 2004, p. 4).

Other considerations. Access is important, of course, but it may not be enough to influence a change in pedagogy and instructional practices. In a qualitative study of two high schools in the Silicon Valley, Cuban, Kirkpatrick, and Peck (2001) found that,

> Incremental changes in teaching style occurred as a consequence of enhanced accessibility to new technologies (especially computers). However, few fundamental changes in the dominant mode of teacher-centered instruction have occurred. Occasional to serious use of computers had marginal to no impact on established teaching practices. A classroom revolution has not occurred. Most teachers in the two high schools adapt technology to fit the familiar practices of teacher-centered instruction. (p. 825)

In a study in Scotland that paralleled Cuban's work (2001), Conlon and Simpson (2003) found

> Scottish teachers and school students mostly have access to computers in their homes and classrooms. The home computers appear to be frequently used. The classroom computers, however, are encountered by

> students only seldom and when students do use computers in the classroom the activity is often peripheral to the learning process, such as word processing of essays. (p. 137)

One study (Dexter, Anderson & Becker, 1999) found that the technology available in education has increased with such rapidity that educational programs are unable to keep their teachers current, and that teachers report feeling overwhelmed by the need to continuously learn new hardware and software. Fishman and Zhang (2003) suggested "Currently, a tremendous disconnect exists between what designers of learning technologies usually intend for their inventions and the actual uses of technology in schools" (p. 14).

Current Status of U. S. Educational Research

Educational research in general has had an inauspicious history and has routinely been challenged as being driven by multiple masters and as not providing strong evidence for the "one best way" of answering complex questions (Lagemann, 2000). Recently, the calls for more specific and useful educational research have grown in frequency. At the same time, the U.S. Department of Education challenged all educational researchers to consider carefully what constitutes scientifically based research (SBR). The No Child Left Behind Act of 2001 specifically requires that SBR use empirical methods, rigorous data analyses, and measurements or observational methods to obtain reliable and valid knowledge. Research must be replicable and lead to findings that can be generalized and are accepted by independent sources. Even more specifically, the National Research Council (NRC) convened the Committee on Scientific Principles for Education Research; its goal was to study the nature of scientific inquiry in education. In its publication *Scientific Research in Education,* the committee lists six principles that should guide scientific inquiry in the field (Shavelson, et al., 2002). According to this report, all educational research should:

> pose significant questions that can be investigated;
> link research to relevant theory;
> use methods that permit direct investigation of the question;
> provide a coherent and explicit chain of reasoning;
> replicate and generalize across studies; and
> disclose research to encourage professional scrutiny and critique.

These new requirements have their critics, of course. Lather (2004) said, "What is less obvious in public reports is that the "evidence-based" or "accountability" movement includes, as well, governmental incursion

into legislating scientific method in the realm of educational research" (p. 15). Lather continues by reminding us that,

> Despite the effort toward a "big tent" of legitimate methods in educational research, the report's call for generalizability, objectivity, replicability, and a unified theory of science ignores the last 40 years of contestation regarding the definition of science, particularly in the social sciences. (p. 19)

Many researchers have argued with the unilateral view, and yet at this time it is the guideline for how funds are distributed and for what is considered "valuable," to the extent that other types of research are taken off the databases supported by the Department of Education. But, how does this relate to our interest in and commitment to the investigation of the use of technology for teaching and learning?

Impact of Research

Gall, Gall, and Borg (2003) suggested "Research currently plays an extraordinarily weak role in educational decision making" (p. 24). Maddux and Cummings (2004) divided research in the field of technology into three stages: (1) Mid to late 70s "In this stage most research was descriptive in nature" (p. 514); (2) Mid to late '80s:

> ...when educators began to realize that neither computer literacy nor the teaching of computer programming in BASIC could justify the time, trouble, and expense of bringing computers into schools. Research improved somewhat, primarily because more experimental studies were conducted and fewer studies had the futile goal of finding general educational benefits as a result of mere exposure to computers. (p. 514)

Finally, Maddux and Cummings (2004) identified stage three as beginning in the early 90s, stating that it

> appeared to promise considerable improvements in the earlier simplistic designs of stage one and two,...however, stage three appears never to have fully arrived, and research in information technology in education may now be mired somewhere between stage two and stage three. (p.514)

Specifically, the unrealistic expectations for technology-based reform and a continuing lack of consensus on research questions and methodologies have resulted in exacerbating this problem. And yet, in reading carefully a call for what is needed in new educational research, the goals described are not unlike what most of us might agree is important. For example, to

> ...trace the evolution of learning in complex, messy classrooms and

> schools, test and build theories of teaching and learning, and produce instructional tools that survive the challenges of everyday practice. ... Design studies, too, offer unique and important perspectives on learning and can be applied productively, often in tandem with other methods. The strengths of design studies lie in testing theories in the crucible of practice; in working collegially with practitioners, co-constructing knowledge; in confronting everyday classroom, school, and community problems that influence teaching and learning and adapting instruction to these conditions ... (Shavelson, et al., 2003, p. 25)

We might agree that "complex and messy" accurately describes all classrooms, and that including technology into our examination makes the classroom even more so. We might also agree that identifying the specific contributions of a technological innovation would be even more difficult to tease out. Given the demands for specific types of research, and the reality that funding often follows those demands, it is clear to many that we now need to develop a proactive approach to a research agenda. This notion was conceived in discussions originating as a dialogue among the editors and editorial staff of several relevant technology journals. The editors and editorial staff of these journals have a broad perspective on work in progress and trends and would like to promote such a research agenda. Educational technology researchers have begun to enter into this dialogue; however, the development of such an activity requires broad input and general understanding of the issues.

A Snapshot on What Research Is Underway and Funded

In an effort to ascertain how the new climate of research on technology is affecting educational researchers, we sought to gather data from educational technology researchers. We sent an electronic invitation to two groups: the Special Interest Group of Teacher Educators (SIG/TE) of the International Society for Technology in Education (ISTE) and the Special Interest Group, Technology as an Agent of Change for Teaching and Learning (TACTL), of the American Educational Research Association (AERA).

Methods. These two groups represent approximately 690 individuals (520 and 170 respectively). The invitation was sent asking for information on their awareness/reaction to the call for Scientifically Based Evidence in educational research, the impact on their research practice, and the impact, if any, on the ways in which they review journal articles or other academic information (Appendix A). These data were examined using descriptive statistics, and the qualitative answers were open coded and examined for emergent themes across the groups (Merriam, 1998; Miles

& Huberman, 1994). Next, the data were disaggregated by the group to which respondents belonged to determine if differences existed between the membership responses.

Results. We received 57 responses to our inquiry, and while this is in no way a representative sample, it provides some insight into the current thinking on this topic. The respondents identified themselves as 74.1% from SIG/TE and 32.1% from TACTL; some respondents belong to both groups so the total is slightly above 100%. These individuals teach a wide variety of courses; specifically, in technology they include general educational technology and integration classes, research in instructional technology or educational technology, design and multimedia, administration and leadership, distance education, and multimedia. Other courses include general methods for preservice and inservice teachers, content specific courses, educational psychology, and learning theory.

Most of the researchers (89.1%) indicated they were aware of the U.S. Department of Education's call for SBR in education. Most of them (86.1%) indicated that they have followed the conversation in journals, Requests for Proposals, and educational media regarding the new directions of research. Respondents were asked specifically how the efforts for SBR have affected their own research. In general, most of the respondents said that their research has been affected by the call for SBR. They reported that they consider the national efforts in their designs by partnering with those who do quantitative research, by making sure they include quantitative components in their grant proposals, and by adding surveys to other instruments. Several respondents indicated that this often made their results seem contrived or "lousy" and perhaps even unethical in the design and compromised in the results. Of those who did not feel affected by the new requirements, some were already doing SBR, others avoided it, and still others said that they are making their doctoral students aware of the issues.

The survey asked if the national efforts toward scientifically based research had had an impact on the way they critically analyze research and 62% of the respondents said it did not, while 38% said that it did. When asked about their own research agenda, a broad range of topics was given, from looking at technology use in individual classrooms to large-scale investigations on programs, projects, hardware or software, to implementation of specific applications.

The survey invited these researchers to describe a proactive research agenda for the field. Many respondents took time to provide their thoughts on what such an agenda might include. Not surprisingly, many areas of agreement emerged. Overall, these researchers suggested the following major topics:

Increase the studies on impact of technology on teaching, learning, student outcomes, instruction, and pedagogy;

Investigate the role of teacher beliefs, effective teachers, school culture/climate, collaboration, and low-end users;

Examine technology issues (best software, upgraded hardware; online learning; nanotechnology);

Improvement of researchers' skills;

Explore the nature of administrators, leaders, and budgets; and

The role of technology in differentiated instruction and content knowledge.

In addition to the similar responses, some contradictions did emerge. Some felt we needed to include more theory in our research, specifically in cognition, and others felt we needed less. Some researchers wanted to drop "satisfaction" studies, and others wanted to know more about student and teacher perceptions and motivations.

Conclusion and Call for Dialogue

This paper presented a look at the landscape of research on the challenges to implementing technology in the teaching and learning process in the P-12 environment. It appears that, although a great deal of energy and effort has been expended, we have not overcome the most obvious of obstacles. Teachers still do not have an environment, culture, support, time or skills to effectively establish ways for technology to enhance their ultimate goal: to improve student learning. Moreover, it appears certain that we as researchers have yet to identify evidence that the effort is worth it in a variety of ways. Until we can offer this evidence that will impact teachers' beliefs about their jobs, we may still face the same challenges that have been identified for many years. The researchers who responded to our survey appear to recognize common goals and needs for our profession.

In looking at the literature base in educational technology and the current research environment, several editors and researchers wrote an editorial to encourage a conversation to develop a proactive research agenda (Bull, Knezek, Roblyer, Schrum & Thompson, 2005). But this is only the beginning and it cannot be confined to a small group of individuals; this dialogue needs many voices and perspectives. As that editorial said,

> A consensus on every point of the compass will not occur, nor is that the intent. There will always be diverse perspectives within an academic community. However, the dialogue will encourage more sharply articu-

> lated research objectives and guidelines. The result should facilitate much needed research in this area. Further updates will be provided in this journal as the dialog proceeds. (Bull, et al., 2005, p. 220)

Currently, educational researchers who study the impact of technology have pressure to demonstrate that some results of using the technology exist and, at the same time, they are struggling with the challenges of the Federal requirements for Scientifically Based Research and evidence based claims. If we situate this conundrum in the context of the P-12 school pressures of high-stakes testing, NCLB, and limited financial resources, it becomes obvious that a carefully organized research conversation may prove helpful to all the stakeholders. It is worthwhile to expand the dialogue and also to gather more data from other researchers in the field of educational technology. It also would be useful to gather more information from educators, administrators, and students in the K-12 system to expand the nature of this dialogue and to effectively create a way of working collaboratively to improve teaching and learning for all learners.

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Appendix A

Survey Instrument

1. Please describe the classes you teach at your university.

2. What research topics have your research efforts focused on in the area of educational technology?

3. What methods do you typically employ in your research?

   Qualitative: (pleasedescribe)

   Quantitative: (please describe)

   Mixed Method: (please describe)

4. Are you aware of the U.S. Department of Education's call for Scientifically Based Research? (if not, please go to question 6)

5. If yes, have you followed the conversation in journals, Requests for Proposals, and educational media regarding the new directions of research?

6. If you are aware of this dialogue, please tell us how this direction has impacted your research agenda, if at all.

7. Has the call for scientifically based research affected how you critically analyze literature? Please explain your answer:

8. If you were to design a proactive research agenda for educational technology, what topics and questions would you suggest? What activities would you propose?

9. Please tell us which organizations you belong to:

   Sig/TE ___

   TACTL ___

Multimedia Case Simulations as Profsesional Learning and Assessment Tools for School Leaders

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Introduction

Within the past decade, as of a result of the increasing availability of ever more sophisticated multimedia hardware and software tools, the creative integration of computer-based multimedia technology to inform the career-long professional learning of P-12 educators has become of special interest to assessment program developers. In particular, the challenges imposed on school leaders by national and state accountability legislative mandates, as well as by local communities demanding their schools be held accountable for the ways schools manage public tax dollars, have emphasized the need for state-of-the-art assessment and professional growth tools that can assist school leaders in navigating current performance and accountability challenges in P-12 schools and school districts. This article presents an overview of one research and development project focused on providing technology-integrated, multimedia assessment and professional learning tools for school principals and other campus-based administrative leaders to enhance their reflective thinking and decision making in the area of organizational accountability and effectiveness.

Administrator Case Simulation Project Overview

The Administrator Case Simulations (ACS) (1995-1998) were developed by researchers at the Texas Tech University College of Education

through external funding from three Texas-based foundations—the Sid W. Richardson Foundation, Abell-Hanger Foundation, and Franklin Charitable Trusts. The ACS case simulations were developed specifically for use by P-12 school principals and other campus leaders (assistant principals, curriculum directors, department chairpersons, etc.) as school leadership developmental assessment and professional learning tools. An integral feature of the ACS case simulation design is its emphasis on connecting school leadership national and state performance standards with school leaders' career-long developmental assessment and professional learning needs—needs which are tied directly to real-world reflective thinking and decision making challenges school leaders routinely face in multiple school contexts. In fact, self-examination and development of school leaders' reflective thinking and decision making through engaging the multimedia case simulations is a central thrust and goal of the case simulation design.

The ACS case simulation portrayals of real school leadership dilemma situations invite school principals and other campus leaders to reflect on context-specific challenges posed within the simulations in connection with relevant knowledge bases and national and state school leadership performance standards and proficiencies. The simulations' reflective thinking and decision making emphasis challenges users to examine case dilemma situations critically and to apply relevant knowledge base concepts and principles to develop real-world action plans to address these tough leadership challenges.

Further, ACS multimedia resources emphasize making school leadership case reflective analysis and decision making for purposes of continuous self-assessment and professional learning an integral part of school leaders' career-long organizational thinking and leading. As a new generation of developmental assessment tools, the ACS multimedia resources represent a technology-integrated approach to school leadership development—one that links data-driven, technology-integrated performance assessment with career-long professional learning.

The increase during the past decade in the availability and power of desktop and web-based multimedia design tools has opened up new possibilities for developers interested in designing useful digital professional learning resources for educators. These design tools enable developers to create rich, interactive digital learning environments that can seamlessly connect multiple kinds of databases and media (including text, graphic, and audio/video). The ACS multimedia resources tap the possibilities of these integrative digital design tools for seamlessly connecting school leadership knowledge and information bases, national and state performance standards, multi-level case-specific data, and

multiple perspectives on addressing school leadership challenges (coupled with end-user interactive feedback and response capabilities). These resources provide principals and other school leaders with a dynamic and interactive digital platform for self-assessment and professional learning.

The section below presents and discusses the underlying conceptual basis of the ACS multimedia case simulation resources.

Case Simulation Concept

The case simulations developed by university-school partner teams at the Texas Tech University ACS Multimedia Lab were designed to artistically link multiple school leadership knowledge and skill bases (e.g., national and state standards and competencies, current knowledge about school change and improvement, etc.) with multiple kinds of case-specific, district- and school-level operational and performance data to provide school principals and other school leaders with new kinds of digitally-integrated, standards-driven assessment and professional learning tools. The individual case simulations utilize a variety of text, graphic, and video databases to portray real-world organizational leadership dilemmas which challenge the reflective leadership thinking and decision making capabilities of school principals and their school community colleagues. The case simulations developed are currently being used in a number of universities and regional education service centers in Texas for performance assessment and professional development of pre- and in-service school principals and assistant principals. However, the overall nature of the case simulations—and, especially, given the collaborative team atmosphere within which they were developed—make them equally effective as organizational learning tools for whole groups of school leaders working in concert (principal, assistant principals, classroom teachers, content and program specialists, community members, etc.) who are interested in studying and finding solutions to complex school leadership challenges.

The case simulations are produced using interactive, multimedia computer technology to involve school principals and other school leaders (e.g., teachers, counselors, curriculum specialists, etc.) in the study of their own reflective thinking processes and the leadership decisions they make affecting students. Individual cases target principals' and other school leaders' abilities in reflectively analyzing complex, multidimensional case challenges, selecting and applying relevant information from multiple school leadership knowledge domains to a context-specific case situation, and then generating sets of focused short- and long-term action plans that can address organizational issues and move a school forward. More specifically, the case simulations developed address issues/problem

areas relating to several important facets of school administrative (i.e., both organizational and instructional) leadership, including the ways in which school principals and their colleagues: (1) accurately (and, inaccurately) define school problems; (2) navigate the gray area (i.e., unclear, complicated, and fuzzy) problems of school leadership practice; (3) chart viable options and analyze consequences within an overall problem frame; and (4) make ethical decisions and engage in evaluative judgments affecting the processes and outcomes of individual, context-specific problems. The case simulations utilize video portrayal capabilities of 2D computer simulation software to engage principals in a powerful "flight simulation-type" advance consequence analysis and decision making reflective learning experience. Thus, the overall aim of the case simulations is to provide a multimedia-enhanced, simulated learning environment in which school leaders can study their own reflective leadership thinking and decision making.

ACS multimedia teams believe interactive, multimedia case simulations as performance assessment and professional learning tools for school leaders and other educators hold considerable promise as a next generation of case learning tools. Principals and other school leaders can utilize the interactive features of the case simulation design to engage simulated, real-world P-12 school challenges and, in so doing, assess and develop their reflective thinking and decision making skills and enhance their organizational learning.

Research and Development Activities

Funded ACS project research and development activities extended from 1995 through 1998. During 1995, initial ACS prototype case simulation development work was funded through Texas state organization mini-grants. Project research and development activities continued during 1996 and 1997 with the support of major grants (totaling US $400,000) from the Sid W. Richardson Foundation (Fort Worth, Texas), the Abell-Hanger Foundation (Midland, Texas), and the Franklin Charitable Trusts (Post, Texas). This external funding provided support for ACS development teams to work on an extended basis with regional schools, school districts, education service centers, professional organization representatives, and state education agency personnel to explore simulation designs and engage in case development activities.

Broadcast-quality beta-cam SP cameras, audio equipment, and digital nonlinear editing system hardware and software were acquired to facilitate field production work and to support case simulation design and post-production refinement efforts. In addition, ACS project teams were

expanded to include a number of university- and community-based dramatic arts specialists, as well as staff developers from regional education service centers having expertise in collaborative school leadership. These specialists joined production teams as important case simulation development consultants and as reviewers/evaluators of case development efforts. Collectively, the camera and lighting, dramatic arts, digital editing, post-production, and other assorted multimedia specialists working in collaboration with university researchers and regional school district and education agency personnel on ACS project teams reflected the broad scope and goals of the project. At the same time, the multidisciplinary composition of ACS project teams also served to highlight two complementary themes of ongoing ACS project efforts—namely, a direct focus on collaborative partnership-building and creative application of technology.

A primary focus of ACS funded collaborative development efforts centered on working in close partnership with principals, teachers, and other school community leaders in regional schools who provided the real-life school leadership dilemma situations on which the case simulations were based. Case simulations developed were all constructed from actual real-world situations and experiences of principals and their school community colleagues who participated as full members of ACS project teams. Principals and school communities with special school leadership case histories of interest to project staff were identified for possible participation in case simulation development through ongoing communications with regional education service centers and state education organizations. Specifically, ACS project staff worked closely with administrator staff development specialists in several regional education service centers in Texas involved as collaborative partners in case development and field testing activities. In addition, ACS team members collaborated with several state professional organizations (i.e., Texas Principals Leadership Initiative, Texas Elementary Principals and Supervisors Association, Texas Middle School Association, Texas Association of Secondary School Principals, Texas Alliance for Education and the Arts, and Texas Professors of Educational Administration) throughout the case simulation development process. These various organizations also assisted ACS project staff in disseminating draft and final versions of multimedia case simulations developed to school leaders and other individuals and groups interested in school leadership improvement across the state.

One interesting aspect of case development work involved the nature and extent of the close collaboration that evolved among university-based ACS project staff and principals, teachers, education specialists, parents, and other school community leaders in identified case site schools. The

process of ongoing dialogue itself that occurred among university staff and school community members regarding the challenging situations confronting school leaders in their individual school communities, the culturally-sensitive and context-specific nature of these challenges, and the learning needs of students—as well as the professional/collegial learning needs of the school leaders themselves who were integrally involved in these situations—generated new insights among participants on the potential payoffs of case development. School leaders in each of the participating case site schools, along with university project staff, began to realize that the case simulation production efforts themselves were, in effect, a new kind of school-centered staff development initiative—a unique and immersive school community-wide collegial learning experience for all stakeholders involved. In participating case site schools, this kind of case-specific and school-centered organizational development initiative became a powerful alternative to existing (and, in many cases, fragmented) staff development emphases.

Thus, one unique by-product of case simulation project efforts was the emerging realization among both university- and school-based team members that immersion in context-specific case simulation development can itself be a new and powerful organizational learning tool for whole school communities, one that may be potentially more meaningful than some traditional, prepackaged staff development. Involving school community leaders directly in analyzing their own school organizational and instructional leadership challenges through developing multimedia cases—within which school leaders explore their real-world school challenges from multiple perspectives and develop specific decision making solutions to these challenges—was found, in all participating case site schools, to invigorate school community members' collective interest in organizational improvement. This was accomplished through focusing school community members' individual and collective organizational energies on problems and challenges of direct relevance to their schools' short- and long-term teaching and learning success. Extending from this, one continuing goal of ACS research and development teams continues to be probing key issues confronting designers and users of multimedia case simulations on the possibilities of the multimedia, context-specific case approach for illuminating (for both researchers and practitioners) some of the complex, collaborative processes involved in the organizational thinking and decision making of school leaders.

Case Simulation Development Process

Throughout 1996 and 1997, ACS project case development teams (which included individual school site administrators, teachers, other

professional staff, and community members as key team members) researched and prepared databases and scripts for filming and multimedia production for each site-specific school leadership case. Case video, expert panel perspectives, and other reflective scenes were filmed at the various school case production sites in Texas. A unique feature of case production work was the intensive effort invested by groups of administrators, teachers, staff specialists, and community members at each school in discussing, analyzing, and then scripting their school leadership case dilemma. These case scripting and development activities served to focus individual school community groups on the deep issues involved in their school leadership case challenges, and emphasized for them the extent and impact of stakeholders' multiple perspectives on these challenges and how these perspectives were often in conflict. This multiperspectivist analysis of school organizational leadership challenges confronting each school community became an important ongoing aspect of school site case development work.

The process of case development involved a number of critical steps occurring both on-site and at the university-based ACS Multimedia Lab, including: (1) selecting and articulating individual school organizational leadership cases (involving case teams delineating multiple school community challenges, themes, etc. present in each dilemma situation); (2) storyboarding individual case video scenes; (3) rehearsing and filming case scenes (involving actual school community members themselves studying and taking on case "roles" of other school stakeholders with varying perspectives); (4) researching relevant case materials (e.g., demographic information on student and school community populations, school performance and improvement data, available content information and resources relating to the case, etc.); (5) preparing various video, graphic, and text databases; (6) laying out, editing, and refining the multimedia presentation; and (7) developing reflective thinking and decision making prompts and user response/data collection mechanisms for inclusion in each case simulation. Instructional technology specialists in digital video capture, non-linear editing, and multimedia production were important members of case simulation development teams throughout the lengthy process of envisioning, designing, and producing individual school cases. Individual case production teams typically spent approximately one calendar year developing and refining an individual case simulation at each participating school site.

Collaborative Leadership Case Set

Funded collaborative project efforts described above resulted in the production of a five-case Collaborative Leadership Case Simulation Set

(ACS Multimedia Library, 1998). This multimedia set includes cases dealing with:

> Collaborative Leadership (consensus building)—This case addresses challenges involved in developing genuine collaborative leadership in schools and the difficulties school leaders often face in attempting to build shared leadership vision among school community stakeholders. A junior high school improvement initiative involving the integration of technology into the curriculum provides the frame for a goal consensus and collaborative leadership dilemma confronting the school community improvement team.
>
> Equal Access (student rights)—This case addresses the issue of student equal access rights in schools. Increasingly, student groups are challenging school leaders to provide a variety of co-curricular and social opportunities (student organizations, clubs, etc.) to meet student interests and needs. Important legal and organizational considerations involving issues of equal access, student rights, and the responsibilities of school leaders for fostering responsive and equitable school learning environments for all students are examined.
>
> Inclusion (special education)—This case explores the challenges school leaders face in providing high-quality, inclusive learning environments for students. Difficulties school leaders can encounter in providing adequate classroom learning environments for all students, meeting individual student needs, ensuring teacher preparedness, and confronting parental concerns are important dimensions of inclusion addressed.
>
> Resistance to Change (teacher assessment and development)—This case portrays some of the complex challenges often encountered by school leaders involving performance assessment and development of school personnel. Issues contributing to difficulties in the appraisal process, including conflicting teacher beliefs about effective teaching practices, team collaboration, and curriculum planning, are explored.
>
> Instructional Leadership (curriculum integration)—Challenges to school leadership related to improving student performance and instructional effectiveness are explored in this case. Several important leadership dimensions of the school-wide instructional improvement process are highlighted, including needs assessment, collaborative planning for curriculum integration, and group ownership in the improvement process.

The ACS cases are keyed to multiple sets of school administrative leadership standards, including the National Policy Board for Educational Administration (NPBEA) standards (NPBEA, 1993) and the Texas Standards for the Principalship (Texas State Board for Educator Certification, 1997/2001). More recent editions of the Collaborative Leadership Case Simulation Set are also keyed to the Interstate School Leaders

Licensure Consortium (ISLLC) standards (ISLLC, 1996). The ACS cases are currently used for both pre- and in-service school principal assessment and professional development in a number of universities and education service centers in Texas, and are available for use by practicing school principals and other school community leaders.

Case Simulation Design Features

The ACS Collaborative Leadership simulations utilize two-dimensional compositing software to engage users in a 2D interactive, simulated school leadership assessment and professional learning environment. The ACS design features a simulated office environment that serves as a visual, organizing metaphor and interface for multiple databases (e.g., student, faculty, and community demographic information, school performance and accountability data, school budgetary information, personnel records, etc.) which school principals and other administrative leaders would be familiar with. The interactive case design allows users to link to specific national and state standards which relate to school leadership challenges posed within individual cases. Virtual mentors (school district central office and/or education agency personnel, and university professors) are also available to users through online communication services incorporated into the simulated school leadership environment design. A variety of text-based information is also accessible via file folders contained in a digital filing cabinet, as well as administrative code, special education, and district policy manuals available in the digital office bookcase. As users navigate through these information databases, they can make notes about case-relevant information in a digital notepad provided on the office desktop. In addition, a Special Help feature (with multi-level diagrams) is provided to facilitate users' navigation within and use of all information databases.

A central area of the simulated school leadership environment is the Case Video Scenes Database. This area includes a number of short scenes portraying multiple stakeholder perspectives and situations informing the overall case dilemma. A key aspect of the Case Video Scenes Database is the dramatic portrayal of interactive clashes among multiple stakeholders and their conflicting perspectives on critical school leadership issues, and how these interactive encounters contribute to the case dilemma. Users navigate through individual scenes via an on-screen control panel. Users can also mark specific sections of video for further analysis through utilizing a videomark icon and notation area.

Multimedia hyperlinking capabilities incorporated into the case simulations' videomark features enable users to isolate and analyze individually selected sections of video, then link their selected scene

analyses to relevant information found in multiple state and national school leadership performance standards (accessed via the Standards databases included within the simulation). Importantly, users document their case-specific reflective thinking and decision making—including narrative rationales for their selection and application of relevant state and national school leadership standards and appropriate information databases to support their decision making—in a Knowledge and Skill Base Application Rationale Area. Within this area, users have ready access as well to all information databases (e.g., school demographic profiles, student performance and accountability data, school budgetary information, etc.) available in the case's school leadership interactive environment. Users input their reflective narrative responses to selected school leadership scenes directly into the computer, which stores user reflective analysis entries in the case simulation assessment program.

Following review and analysis of individual case video scenes, the simulation's Case Reflective Decision Making Area provides an opportunity for school principals and other administrative leaders to further develop and refine their case-specific reflective thinking and decision making. This area stimulates users to directly apply organizational leadership insights about case dynamics gained from their individual scenes reflective analyses to develop specific decision making action plans. A series of focused, open-ended question prompts guide users in formulating and presenting their action plan decisions. The prompts encourage users to examine key themes and issues portrayed in each case, and to consider appropriate short- and long-term decision making options and leadership strategies. A series of short expert panel video sequences provides users with relevant perspectives and reflective insights on critical dimensions of each case. As users interact within the reflective decision making area and other areas of each case simulation, they have full access to the variety of multidimensional information databases and other resources provided within the interactive, school leadership assessment and professional learning environment design.

The overall purpose of the ACS case simulation design is to focus users on examining a complex set of organizational leadership challenges confronting a school principal and other school leaders portrayed in each case and to highlight the multiple, conflicting stakeholder perspectives that often characterize such dilemma situations. These multiple stakeholder perspectives (which frequently clash in complex school leadership dilemma situations) become focal points in the simulation design that users can leverage to reframe the context-specific case situation and develop action plans that have potential for moving the school community forward. Thus, the ACS case simulation design's reflective thinking and

decision making focus provides a technology-integrated, interactive simulation platform within which principals and other school leaders can explore creative administrative options and decision making solutions to real-world, P-12 school leadership challenges.

Project Findings and Discussion

Development and use of the ACS case simulations over a ten-year period involving a variety of education professionals—case development teams, education service center staff, professional organization leaders, state education agency personnel, and pre-service and in-service school administrative leaders—have resulted in a number of research and development project findings relating to the potential of technology-integrated case designs for enhancing the reflective thinking and decision making capabilities of school leaders. These research and development findings are presented and discussed below.

Case simulations were helpful in assisting school leaders identify individual proficiency strengths and target areas for further professional growth.

The interactive ACS design enables each case simulation to become an individual, diagnostic assessment and professional learning tool for principals. The case simulation design incorporates concepts of reflective analysis and decision making focusing on the real-world, practical leadership needs of school practitioners (Schön, 1983, 1987). In addition, the cases are specifically configured to help principals accurately identify strength areas and target professional growth needs in terms of mastering national- and state-level school leadership proficiencies.

As users navigate through each case simulation, they are encouraged to respond to a variety of reflective data collection mechanisms embedded in the case design. Users can record their case reflections and analyses in the electronic notepad provided on the desktop. Additionally, users can input their own reflective thinking and decision making perspectives on aspects of case leadership challenges by responding to several open-ended question prompts provided in the Reflective Decision Making Area within each case. These reflective data are stored on a floppy disk that accompanies each case and sent to the ACS Multimedia Lab for analysis. Using quantitative and qualitative analysis software, a user-specific assessment profile is then generated based on individual user case simulation performance data. Individual user assessment profiles are keyed to knowledge and skill domain areas reflected in the national and state performance

standards and highlight targeted areas for school leadership improvement.

Working performance benchmarks (for generating individual user assessment profile performance levels) are established through a process of obtaining representative samples of school principals' performances at various mastery levels within individual case simulations. Assessment profiles generated can be used by principals and other school leaders (either individually or working with an assessment team) as additional, data-driven process information to develop customized professional growth plans.

Case simulations were deemed useful as opportunities to model best practices.

The compressed video vignettes incorporated into the ACS case simulation design modeling professional best practices in a variety of settings were found to be especially useful to school leaders. These best practice vignettes were deemed useful to school leaders utilizing the simulations for several reasons, including: (1) they present a clear focus on career-long, professional development of school principals and other school administrative leaders; (2) the vignettes are part of the overall interactive and self-paced professional learning design of the simulations; (3) the model vignettes are grounded in the realities of day-to-day school practice; (4) the vignettes were found to be powerful tools for portraying consequences of school leadership decision making; and (5) the model vignettes exemplified critical reflective analyzing processes involved in thinking through and acting on tough school leadership problems.

Case simulations represent a new approach to organizational and professional learning.

Through engaging school production teams in writing and developing multimedia cases about their context-specific school leadership challenges, the ACS case simulations were essentially embracing a "collegial case approach" (Shulman, 1989, pp. 183-184) to organizational and professional learning. Extending from the "teacher cases" concept originally proposed by Shulman—in which teachers write year-long case histories of their teaching and learning challenges and successes with students in individual grade-level classes that can become part of a growing "case teaching library" for teacher professional sharing and development—the ACS case simulations represent a new generation of multimedia teaching, leading, and learning tools which school leaders (teachers, diagnosticians, counselors, principals, and community members) can collaboratively develop and share with colleagues in their own

and other school districts. As new multimedia cases are developed and shared, these cases can collectively inform an evolving multimedia case library which can be uploaded onto internet websites via video streaming for access by multiple school leaders and school leader groups. In this way, the multimedia cases can serve as readily available school leadership tools which multiple stakeholders in preK-12 school communities can utilize to assist them in examining and reframing their own context-specific school leadership challenges.

Case simulations and the Administrator Case Simulation Project itself were found to be generative catalysts for multi-stakeholder partnering.

The case simulation project development and implementation activities themselves served as natural stimuli for multi-stakeholder partnering among educators interested in school leader professional assessment and development and yielded some intriguing multiple learner payoffs. The convergence of a variety of collaborative partners (university educational leadership programs, regional education service centers, educational leaders in schools and school districts, business and industry special interest groups, and state education organizations in Texas) to develop and share the case simulations highlighted the collaborative learning benefits of adopting a "collegial team approach" to designing career-long assessment and development of school leaders. In a real sense, the ACS case development activities themselves became a powerful reflective learning experience for case team participants.

In addition, case simulation development and sharing activities can become a new, alternative form of staff development for campus-based school leadership groups as well as entire school learning communities. School leader groups can use existing cases and/or form their own case production teams to study meaningful school leadership challenges facing their campuses. Newly developed cases, case analyses conducted, and reflective decision making action plans generated from these "organizational case learning" study teams can become part of an ongoing case learning library for the school and district that can be shared with other districts via web-streaming. School leadership knowledge and insights gleaned from these case learning study teams can become part of a larger evolving internet-based "case simulation resource bank" available to multiple stakeholders interested in enhancing the reflective thinking and decision making capabilities of school leaders. Importantly, school leadership knowledge and insights generated can be shared with multiple stakeholder groups involved in educational policy formation (e.g., legislators, educational agencies, professional organizations) to positively

influence educational policy development relating to school organizational leadership and effectiveness.

Finally, one intriguing by-product of engaging in developing and sharing organizational cases observed by ACS teams is that school leadership groups develop new levels of "leadership density" (Sergiovanni, 1989, p. 221) in their school communities—that is, school members learn how to identify and refine new ways of working together better and more effectively as collegial leaders. School leaders gain new insights from their engagement with the case simulations on how to go about forging new and/or stronger leadership linkages between and among key stakeholders and stakeholder groups (teachers, diagnosticians, counselors, principal and assistant principals, parents, community members, etc.) and, in so doing, increase the mutually-beneficial, connective non-zero-sum web (Wright, 2000) of collaborative information-sharing and leadership in their school organizations. Through collaborative team efforts using the case simulations, school leaders can learn ways to effectively synergize disparate, multiple individual stakeholder visions into productive, consensual school organizational "vision networks" (Senge, 1990, p. 212). School leaders can then leverage these vision networks to collectively forge new, more meaningful multi-perspectivist understandings regarding responsibilities and opportunities available to school community members for enhancing school teaching, leading, and learning effectiveness.

Case simulations hold potential as career-long tools to enhance educators' reflective thinking and decision making.

Evidence from activities of case development teams and analyses of data from school leaders' use of the case simulations in pre-service and in-service settings suggest that perhaps the most important payoff of the ACS case resources is their potential for serving as career-long assessment and professional learning tools to enhance school leaders' reflective thinking and decision making abilities. The interactive case reframing and analysis features built into the overall design of the ACS cases encourage users to critically examine the multi-perspectivist leadership challenges confronting stakeholders portrayed in the case situation through linking these context-specific challenges to appropriate state and national leadership standards and examples of best practices. Users are then guided within the ACS interactive design in formulating insightful decision making strategies via focused, open-ended question prompts and expert panel video sequences to arrive at coherent, data-driven short- and long-term action plans. Collectively, these interactive design features—in conjunction with the overall design intent of the case simulations to foster multi-stakeholder collaboration through creative application of

multimedia technologies—stimulate users to engage together in meaningful conversations to enhance their professional and organizational reflective practices (Schön, 1983, 1987).

Conclusion

The underlying motivation for designing the ACS case simulations was to integrate interactive, computer-based technologies with administrative leadership national standards and key concepts and principles of school leadership professional practice to develop useful reflective thinking and decision making tools for school leaders. The ACS research and development activities and findings presented and discussed in this article represent an initial decade of work completed as part of a continuing, long-term R & D effort to design, develop, and provide technology-integrated, professional thinking and learning resources for school leaders. Based on findings from ACS Project research and development work completed thus far, these kinds of technology-integrated case simulation designs demonstrate real promise as useful career-long reflective thinking and decision making assessment and professional learning tools for school leaders.

ACS case simulation resources are continuing to be used at various universities and regional education service centers in Texas for diagnostic formative assessment and professional development of pre- and in-service school principals and assistant principals, as well as in multiple schools and school districts as collaborative leadership development resources. In addition, ACS project teams are working on developing additional case resources for a variety of other school personnel, including classroom teachers and content and program specialists (e.g., school counselors, reading recovery specialists, special education diagnosticians and supervisors, gifted and talented program coordinators, etc.).

Finally, prospects seem very promising for the continued development and refinement of technology-integrated case simulation designs to benefit school leaders. ACS project team efforts reviewed in this article are just one example of the ways school leaders and assessment program developers can work together to creatively tap the rich potential of multimedia technology to enhance the professional thinking, leading, and learning of all school leaders.

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Online Learning:
Implications for Higher Education Pedagogy and Policy

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Introduction

In 1997, in an article entitled, "The Internet and Education: A Close Fit," Neil Rudenstine (1997), president of Harvard University, while asserting that direct human contact was absolutely essential to serious education, observed that the Internet and other electronic networks allow communication to take place at all hours and across any distance as well as permit a significant extension of the scope, continuity, and quality of certain forms of instructional interaction. Furthermore, he observed that these technologies were having an enormous influence on traditional education while redefining our concept of distance learning.

The U. S. Department of Education (1997) released a report in that same year which indicated that 22 percent of American colleges and universities were offering some form of distance learning using online environments. Most of these institutions had long histories of providing distance learning programs in other delivery formats such as television, video cassettes, and printed course lab packs to geographically-dispersed students. Online learning was in its beginning stages in 1997 and was part of the emerging embrace of the Internet and World Wide Web by many segments of American society. Was online learning just another technological bubble that would soon burst along with many of the "dot.com" businesses, or was it a substantive enterprise that would be here to stay?

Seven years later in 2004, a majority of all American colleges and universities were offering fully online courses enrolling approximately 2

million students. In the public sector institutions especially, where increasing student access to education is an important part of their missions, the percentage offering online courses was as high as 90 percent (Allen & Seaman, 2004). In a national survey of chief academic officers, Allen & Seaman (2004) reported that 52.6 percent viewed online learning as critical to their institutions' overall long-term strategy. While the growth of online learning is well-documented, it has not been universally accepted as beneficial. David Noble (2003) has sounded a loud and consistent warning that faculty move cautiously into the world of online learning. Concerned with cyber-hype and likening "digital diploma mills" to fast-food commodities, Noble sees an erosion of the very foundations of higher education by online learning providers. Despite the opposing viewpoints, online learning is having a profound impact on many segments of higher education.

Colleges are increasing their involvement in online learning for a number of reasons, including: expanding access to education for students living afar; providing more convenient access to urban and suburban students leading busy lives that combine career/work/family responsibilities with an education; providing educational opportunities for home-bound students; and allowing military personnel whose careers/jobs require them to travel a great deal to continue their educations. There have been a number of studies that indicate that online learning is perceived to be comparable to traditional, face-to-face instruction. There is no need here to review this extensive literature (see Allen & Seaman, 2003, 2004; Hartman & Truman-Davis, 2000; Hiltz & Goldman, 2005; Picciano, 1998, 2002; and Shea, Fredericksen, Pickett, Pelz & Swan, 2000). Underlying its expansion is an acceptance of the pedagogical value of online learning by both students and faculty. A couple of million students and several thousand faculty would not continue to learn and teach online if there were no pedagogical value in this approach. Students would not continue to pay tuition (and in some cases, a higher or premium tuition) for online courses. Neither would faculty spend additional hours and days converting and preparing material for online delivery if they did not believe that students are able to learn, and possibly learn well, in this environment.

The absence of students and faculty on campus and in traditional classrooms has implications for a wide range of policies. Issues have emerged at several levels (local college, university systems, regional and national agencies) and, in many cases, have led to intense debate and negotiation. The U. S. Congress has been discussing the financial aid implications of distance learning for the past several years. Accreditation issues have arisen as regional accrediting agencies find themselves

approached by online institutions that operate all over the world. Online course development has opened new venues in collective bargaining as compensation, class size, definition of office hours, intellectual property rights, and teacher evaluation are all revisited.

Since the mid-1990s, a plethora of study and discussion has emerged in many colleges and universities as they try to assess and evaluate the educational benefits of online learning environments. This assessment has become more complex as faculty have begun to integrate online with face-to-face instruction, in some cases without the awareness of academic administrators. In addition, technical support services needed for online learners and teachers have required higher education administrators to invest in the people and equipment that undergird Internet and World Wide Web instruction. "Digital divide" and access to technology issues among low-income and minority students, while abating, have not completely disappeared. Perhaps the most significant issue is the emergence of new online learning providers, especially "for-profit entities that could potentially change the face of higher education" (Ruch, 2001, p. 154). The purpose of this article is to examine and to reflect on these and other implications of online learning for higher education pedagogy and policy. This is a timely endeavor as online learning continues to expand, to evolve, and perhaps to change higher education.

The Pedagogy of Online Learning Environments

Online learning is not one thing. It comes in so many shapes, flavors, and colors that students might not recognize any similarities in its use by different instructors in the same college. This is similar to the differences in face-to-face instruction where faculty vary their teaching depending upon course objectives, academic level of students, and discipline. In one course, online learning may be used to enhance the traditional lecture with electronic instructor notes, additional readings, and images of charts, graphs, or other handouts. In another course, online learning may be blended with face-to-face instruction so that, rather than meeting in a classroom three hours a week, a course meets two hours per week with the third hour consisting of an online threaded discussion. In still another course, utilizing an interactive asynchronous learning network (ALN), all classes are conducted online using a sophisticated course management (or learning management) system. In an adult education skills training course, a self-paced, media-based e-learning model may be used where students follow carefully scripted, programmed instruction in online modules and progress through the material as they master each learning objective. In American colleges and universities, all of these as

well as other models of online learning are being used by thousands of faculty. There is clearly no single pedagogy of online learning. Teaching methods must be viewed along the continuums of technology infusion versus face-to-face contact, student-faculty interaction, synchrony-asynchrony, text-based or multimedia enriched components. In this dynamic world of online learning, definitions are used loosely to refer to generic approaches rather than to demarcate clearly a pedagogical entity. For example, in the past few years, courses where online learning is used in conjunction with or shared with face-to-face instruction might be referred to as distributed, blended, hybrid, mixed-mode, or Web-enhanced learning.

While it is impossible to do justice to the many varieties of online pedagogical approaches in an article of this type, it is possible to identify some common pedagogical techniques and to speculate on their impact on teaching and learning. At the outset, it needs to be said that online learning may not be appropriate for all types of instruction. For example, it is difficult to replicate a hands-on chemistry or biology laboratory activity in an online environment. Software does exist that simulates these activities but not all science faculty accept simulations in lieu of actual hands-on laboratory work. Classes in nursing, health science, social work, and education where students are observed by faculty in the field are not easily duplicated online. The evaluation and instruction of these classes might require close observation of their bedside manner, empathy, and ability to work well with people and children who need help and assistance. This type of observation from afar or in an online mode may not be practical. There are also areas of study that by their nature almost require physical presence of the teacher and student such as the arts (dance, theatre, music), physical education, and speech. While some of the course work in these subjects can be simulated online, most of these activities will continue to be done in traditional, face-to-face environments.

In the following paragraphs, three pedagogical elements—instructional planning using course management software, interaction, and reflective teaching—will be examined as important components of online learning environments.

Instructional Planning and Course Management Systems

Course management systems (CMS), also referred to as learning management systems (LMS), have proliferated during the past decade. Once only acquired by a small number of colleges, now they can be found in most colleges and universities. Warger (2005) reports that the two most popular CMS packages, Blackboard and WebCT, each claim to have more than two thousand customers. A good CMS assembles several

technologies into a single, coordinated suite of instructional services, including online discussion and messaging boards, calendars, syllabi, automated testing and grade posting, class and workgroup e-mail distribution lists, and student portfolio pages.

Beyond reducing the drudgery of developing and simplifying the development of the HTML (hypertext mark-up language) to mount an online course on a Web server, a CMS requires instructors to consider and to organize all the various components of a course delivery design including assignments, discussion sessions, instructional resources, and media. This awareness of course organization, imposed by the CMS, is well-recognized as important to good pedagogical design. Teacher education programs have for decades emphasized the importance of lesson planning and organization. Unfortunately, many faculty teaching in higher education have never had the benefit of a course on teaching methods where emphasis on organization and planning are fundamental. In a traditional face-to-face class, ad hoc issues or problems can frequently be handled by virtue of the fact that both teacher and students are assembled in one place at one time. A laboratory experiment that does not quite work out can be explained or tried again by the instructor. A bulb that blows out on an overhead projector can be replaced. The time lost during a fire drill or because of inclement weather can be made up by speeding up another part of the class or assigning extra reading. In designing an online class, the instructor must organize the delivery of content as well as anticipate things that might go wrong and plan ahead accordingly. What if a server goes down; if students do not have a current version of a software package; if a student's home computer crashes? While the CMS does not solve these problems, it provides an organizational template that encourages instructors and support personnel to think ahead and to provide back-up activities and "Help" facilities to assist with the problem.

Several recent enhancements to CMSs are also worth mentioning. The ability to set up student groups within a class is especially conducive to collaborative learning activities. Utilizing group discussion boards and email, students can use the CMS to work around some of the logistical problems with regard to meetings inherent in collaborative learning projects in a traditional class. Electronic or "e" portfolios which can be used either in a group mode or for individual students are also evolving in CMS software. These e-portfolios are especially appropriate in professional programs where students need to document activities in real-life situations as they happen in an internship or field experience.

One concern with CMS software, particularly with course templates, is that they might enforce a standard online course delivery format. For some institutions where course content and instructional standards,

including all readings, assignments, and activities, are closely monitored and controlled, this might be desirable. However, in other institutions where faculty have a good deal of flexibility to practice the craft of teaching, standardization is problematic. This was one of the major concerns identified by David Noble earlier. In many institutions, faculty have both pedagogic and academic freedom to emphasize and de-emphasize content and to approach class material as they wish. CMS course templates, while not requiring fully scripted courses, suggest standardization but, at the same time, allow for individual customization.

Interaction

Perhaps the most controversial pedagogic issue associated with online learning environments is the nature of the class interaction. Experienced online instructors, particularly those who make extensive use of threaded discussion boards, indicate that they have a good deal of interaction with students, albeit not of the face-to-face variety but through written expression (Hartman & Truman-Davis, 2000; Picciano, 2002; Shea, Fredricksen, Pickett, Pelz & Swan, 2000). Others see the physical separation of teacher and students as never being the equivalent to face-to-face interaction.

The e-learning online model where students follow scripted programmed instructions with minimal contact with faculty has been criticized as an impersonal, non-interactive approach. The threaded discussion, which is the mainstay of the asynchronous learning network (ALN) model, can provide a communications vehicle for each student to participate at his or her convenience. This is particularly important for faculty who design classes to take advantage of written exchanges on topics that can be explored and developed over extended time periods. A class discussion, for example, can go on for days without being constrained by a bell schedule. Furthermore, multiple written expressions may be more carefully conceived forms of communication that reveal what a student truly thinks, feels, or knows about a class topic. On the other hand, the spontaneity of the verbal comment is gone in the asynchronous online mode. Which would an instructor rather have—the spontaneous verbal expression or the carefully constructed written comment? Faculty are divided on this issue, with some preferring one over the other; and, in some cases, desiring both.

Related to this issue is the time constraint on effective student participation in a face-to-face class. It is practically impossible for all students in a class of 25 to participate substantially in a 50-minute or even a 100-minute class session. Some students will have the opportunity to participate, but most will not. On the other hand, one student in the

evaluation of an ALN course commented: "The bell never rings and the class is never over" (Picciano, 1998). All students can participate in every week's class discussion and frequently do. There is never a reason not to post a message to a discussion board because of competition from time, because it takes more time for some students to process a thought or comment, or because oral communication is slower for a student whose first language is not English.

Interaction is also enhanced in an online threaded discussion since students have the ability to share work with one another. In a face-to-face class, this is difficult outside a small group. If a paper or essay is assigned, a prohibitive amount of class time would have to be set aside to allow students to share orally their papers with one another. Another possibility would be for students to make copies of their papers (or summaries of same) for each student in the class. This involves excessive amounts of paper. In a threaded discussion in an online course, to have each student post a summary of a paper or essay is easily accomplished and can routinely be included as part of a lesson. Such a pedagogical strategy can lead to a significant amount of student-to-student interaction through comments about and references to each other's papers. In sum, interaction in an online class can be rich, deep, and lengthier than in a traditional class, but it is a different type of interaction. The face-to-face class provides physical interaction (a pat on the shoulder, eye contact, a smile), spontaneity, and the humor of the moment which is difficult to achieve in the online environment.

Reflective Teaching

Any discussion of the pedagogy of online learning would not be complete without reference to reflective teaching. For some of the reasons mentioned above—namely, the extension of class time and the reliance on the written word or comment—the online learning environment is very conducive to reflective teaching. Briefly, reflective teaching relies on slowing a class or discussion down to allow students time to think and reflect on a topic. In our fast-paced society, reflection as a teaching strategy is gaining popularity, although there are surely faculty who see the benefit of heated and even aggressive verbal "in the moment" exchanges. However, in courses that require critical thinking skills or that are not bound by the need to reach conclusions quickly, reflective teaching is a desirable pedagogical approach. Case studies, critiques of works of art, and problem solving are activities conducive to a reflective teaching strategy. While reflective teaching can occur regularly in both online and face-to-face classes, the former provides more time for reflection. There is nothing that suggests that reflection occurs best

within 50 or 100 minute time frames. Allowing more time for analyzing, critiquing, and problem solving also allows more time for inspiration.

Online learning provides a number of pedagogical approaches that are different from and at least as effective as those used in face-to-face instruction. A case can be made that some of these techniques might even be more effective in an online mode. Indications are that these approaches have been accepted by large numbers of faculty and are here to stay.

Policy Issues of Online Learning

Online learning has generated much policy discussion at all levels of the higher education enterprise. The pedagogical issues and approaches discussed in the preceding paragraphs evolved in the midst of extensive discussion and negotiation among faculty, administrators, and education policy makers. These discussions generally required and continue to require consideration of the changes that occur when classes are taught at a distance, when faculty may never see a student, or when a student may never see a fellow-student. In this section, online-learning related policy issues that have evolved and continue to evolve along with the pedagogy are presented.

Faculty Personnel Issues

Until the mid-1990s, distance learning occurred in colleges and universities that had long, established traditions of teaching students from afar. Policies and procedures, including those related to compensation, employment conditions, and other personnel issues, generally were in place and well-established in these institutions. Administrators and faculty working in distance learning colleges or programs understood that they were serving special populations and that their employment conditions were different than those in traditional, face-to-face programs. However, in the mid-1990s, when colleges and universities with minimal if any history of providing distance learning started offering and encouraging faculty to teach online courses, a number of issues arose which required many institutions to review policies and employment practices that had been taken for granted. These reviews were not always amicable. At City University of New York, for instance, the Professional Staff Congress, the organization representing faculty and other professionals, declared a moratorium on any form of distance learning in June 1997, citing that the University had not established any policies related to distance learning. Intellectual property, college governance procedures, reassigned time, and additional compensation were among the issues that needed to be reconsidered (Kimmich, 1999). While these same

issues were playing out at local campuses throughout the country, the National Education Association (NEA) and the American Federation of Teachers (AFT) issued position papers and recommendations to their affiliates urging faculty and administrators to reconsider collective bargaining agreements in light of the expansion of online distance learning activity (Higher Education Program and Policy Council of the American Federation of Teachers, 2000; Kriger, 2001). The Institute for Higher Education Policy was commissioned by the NEA and AFT to conduct a study to examine issues of quality and practice to inform policy makers and collective bargaining negotiators on distance learning issues (Phipps & Merisotis, 1999). Negotiations with regard to these issues continue today.

One major issue that continues to be raised focuses on the faculty who teach online. In many colleges and universities, most online courses are taught by adjunct faculty. Joe Schneider, deputy executive director at the American Association of School Administrators, observed: "regular faculty are very reluctant to do it [teach online] because it's a lot of work,...and Universities who want to do it have to hire adjuncts to get it done" (Carnevale, 2004, p. A31). Jamie Horwitz, a spokesperson for the American Federation of Teachers, says he is worried that many colleges are taking advantage of their adjuncts and that, furthermore, the AFT is not pleased about the growth in the number of virtual institutions that award degrees without any face-to-face interaction between mostly adjunct professors and students. "This is the convergence of two major issues that we've been following—the growth of online education and overuse of adjuncts..." (Carnevale, 2004, p. A31). Horwitz went on to say that the position of the AFT is that instructional quality may suffer because of the proliferation of adjunct faculty teaching online courses. This issue is not abating. Regional and professional accreditation organizations as well as state education departments are considering the implications of an overdependence on adjuncts in all forms of academic programs. While guidelines and recommendations have been developed cautioning colleges and universities regarding high percentages of courses taught by adjuncts, the problem persists and, in fact, may be growing as Horwitz suggests.

Another major personnel policy issue directly related to online pedagogy is the need for training and faculty development. While especially critical in the 1990s when faculty literally had to be taught to teach online, the issue is still important today as more faculty, some of whom have less technological expertise than early adopters, begin to convert or develop courses for online delivery. Course management systems mentioned earlier in this article have made the development of online courses easier, but a need still exists to train faculty in both the

technology and pedagogy of online instruction. Technology training topics include how to use the technical features of a CMS, how to develop multimedia, and how to design creative and interesting course Web sites. Pedagogical topics include how to develop vibrant online discussions, techniques for developing social presence, or how to do collaborative learning online. The major goals and objectives of earlier training and faculty development programs concentrated on converting existing face-to-face courses to online delivery. However, as experience and expertise have been building in online teaching, more faculty are rethinking how to offer their course material rather than simply converting existing material. This has been a positive development for higher education since many college faculty do not have any training in teaching or pedagogy. Online learning has spawned a good deal of activity at colleges and universities that focuses attention on the art of teaching which may be having benefits for both online and face-to-face instruction. Joe Rachlin, former Dean at Herbert Lehman College, once commented that: "in my thirty years of experience in higher education, the best discussions I have ever had about pedagogy of any type were when I was part of a faculty development group examining how to teach online" (Picciano, 1999, p. 3).

Operational Policy Issues

The expansion of online learning has required college and university administrators to consider a host of operational policy issues related to instructional support. The most obvious area involves establishing and maintaining the technology infrastructure. High-speed data communications that allow students and faculty to access online course material must be made available twenty-four hours a day, seven days a week. Increasingly expensive course management systems need to be acquired and maintained. A CMS, which in the 1990s could be purchased for several thousand dollars, is now priced according to class enrollments and can easily cost hundreds of thousands of dollars over several years. Complicating the CMS issue is the open source movement which shares software including CMS (e.g., Moodle, Sakai Project) among users at no cost, but comes with little or no technical support from a traditional vendor. College administrators face difficult technical policy issues on whether to standardize all online course development on one vendor or product, or utilize multiple products or combinations of vendor-supplied and open source products.

In addition to hardware infrastructure and software, one of the most expensive elements of technical support is the staff people who install, maintain, and upgrade hardware and software, and train others on how to use the technology. Departments and sub-departments have been created or expanded to provide integrated support services for online

instruction. Beyond the technology is the need for assisting faculty in instructional design. While instructional designers have been used routinely by colleges with long histories of providing distance learning materials, colleges new to distance learning have had to establish or significantly enhance instructional design units.

Students need and expect electronic academic support services as well. These include libraries, technical help facilities, tutoring, and advisement. Other student services related to admissions, financial aid, registration, and counseling also are evolving to accommodate the online learner. What all of this means is that in the past decade college administrators have been immersed in making the policy decisions necessary to retool their technological, academic support, and student support operations to meet the needs of students who work and study online. These issues will take on additional importance as more students enroll in online courses and as colleges gear up to take advantage of the "next wave" of data communications technology that will feature greater speed, more multimedia, wireless connectivity, and expanded portability.

Perhaps the most difficult issue for college administrators was and is how to pay for technological, academic, and student support services? While technology budgets have been expanding at most colleges and universities, a good portion of this funding has been received from students in the form of increased tuition and fees. Specific fees to support technology are becoming commonplace at many institutions of higher learning (e.g., City University of New York). Some schools (e.g., University of North Carolina) require that incoming freshmen purchase laptop and other computer equipment in order to participate effectively in their academic programs. For online courses, it is not unusual to see additional fees or higher tuition charges (e.g., Stanford University, Penn State's World Campus). This is due in part to the history of many of the major online learning providers which evolved from self-sustaining administrative units or cost centers that were separate from the main academic programs in their colleges and universities. For example, the University of Maryland University College, a very successful online learning provider, originally was the adult and continuing education program unit of the University of Maryland-College Park. It receives a very modest subsidy from the state of Maryland and is expected to cover the costs of its programs primarily through student tuition and fees.

Financial decision making and establishing fee structures have involved hours and hours of policy discussions at state governing bodies, university systems, and local colleges as policy makers and administrators grapple with the rapid expansion of online technology. There is little evidence that any of this expansion will subside in the near future,

thereby requiring colleges to find additional funding, to reallocate existing funds, or to pass the costs on to students.

Accreditation, Assessment, and Program Quality

Judith Eaton, President of the Council for Higher Education Accreditation (CHEA), in an article directed at "presidents, chancellors, other college and university administrators, and trustees" called on administrators to become informed on quality issues related to distance learning. She defined distance learning as: "online teaching and learning, as well as academic support and student support services that are electronically delivered" (Eaton, 2000). In the article, she goes on to state:

> In the fluid and sometimes volatile environment created by distance learning, we at the Council for Higher Education Accreditation (CHEA)—the national coordinating body for national, regional, and specialized accreditation—struggle to bring some order to the avalanche of information about both distance learning and quality assurance. (Eaton, 2000)

Eaton highlights the critical state of policy issues that have evolved as a result of increasing online learning—especially related to program quality. The major American accreditation organizations have adopted standards for online learning programs that closely mirror those established for traditional face-to-face programs; however, there is a need for much more discussion to determine if these standards are accomplishing their purpose.

Online learning has opened up new avenues of quality assurance and academic standards in higher education. First and foremost is the question of whether academic program goals and objectives are being adequately met in online learning environments. In the introduction of this article, a number of references were cited that support the premise that learning experiences in online environments are comparable to those in face-to-face classes. However, the issue of program quality in the context of accreditation also relates to the extensive literature on using assessment procedures to measure learning outcomes. It is recognized that online learning may present challenges to doing proper assessment of student outcomes, but it might also provide new opportunities. For example, testing and other forms of summative evaluations frequently used to assess student learning are very problematic in an online mode. As a result, many online distance learning providers have established policies that all written tests be conducted in proctored, face-to-face environments to ensure the identities of the students taking the tests. On the other hand, online learning also provides opportunities for enhancing and extending assessment activities. Online learning environments that

rely on programmed or self-paced instruction generally have built-in assessment of student mastery of subject matter. A complete record of student progress, including ongoing formative testing, is a common element of this type of instruction and should meet the needs of many assessment programs. Even in more highly interactive, asynchronous online models where students are expected to communicate ideas, comments, and responses to questions via written electronic bulletin boards, instructors have a complete record of student participation in class activities. Instructors can integrate assessment into electronic group discussions that result in a complete record of the activity. Most of the popular course management software systems used in online learning allow for the entire course to be archived. An instructor can simply add comments on his assessment of the students and create a complete record for future reference. This is not possible in most face-to-face class situations unless videotaping, audiotaping, or some other form of recording technique is used. In sum, online learning environments pose challenges but also provide opportunities for doing assessment of student outcomes. The approach faculty and administrators are taking is to provide multiple means for doing assessment of learning in online mode while not necessarily changing the goals and objectives of their academic programs because of the different delivery formats.

Second, most accreditation standards were developed with the assumption that instruction was centered within a physical entity identified as a classroom in which a group of students and a teacher met for so many hours per week in a place called a college. Online learning and virtual environments do not operate in physical places or at specific times but in the electronic world of the Internet and World Wide Web. Basic questions have arisen such as: How do hours spent in online activities equate to time normally spent in a physical classroom? How does a professor know who is responding to a question on a discussion board? How often do students need to respond online to participate effectively or in a sense be "present" for online course activities? These questions do not have simple answers but instead serve to require policy makers to explore venues for agreement among the various stakeholders.

Third, perhaps the most significant issue for policymakers concerned with accreditation and program quality is the increasing number of online learning providers, some of questionable quality. David Noble, quoted earlier, popularized the term "digital diploma mill" to characterize less than scrupulous online learning providers that essentially provide online degrees with minimum or no academic requirements. No one questions that such institutions should be closed down for their fraudulent operations. However, they also raise policy issues for legitimate distance

learning providers who need to accredit their programs. For example, Athabasca University, a well-respected, publicly supported Canadian open university, has physical campuses in Athabasca, Edmonton and Calgary, Alberta, enrolls online students from around the world, and is in the process of receiving accreditation in the United States from the Middle States Association of Colleges and Schools. It needs to do this in order to establish its legitimacy, to increase its appeal to American students, and to distance itself from the diploma mills. Likewise, a for-profit entity, the University of Phoenix, with an enrollment in excess of 140,000 students, providing traditional face-to-face as well as online learning in almost two hundred campuses world-wide, applied for and received accreditation from the North Central Association of Colleges and Schools in the United States.

Athabasca and the University of Phoenix are significantly different from the traditional, not-for-profit public and private colleges which American accreditation agencies have typically served. The accreditation agencies are being challenged to develop appropriate procedures for online education providers while policy makers question whether national, regional, and specialized accreditation as we know it can assure quality in online programs. Eaton (2000) concluded her article with a warning that CHEA as well as the accreditation agencies need to provide more organization and coherence to the "plethora" of information and issues involved with quality assurance in online learning and that "the price for misunderstanding ... is very, very high" (Eaton, 2000). Such a misunderstanding could lead to even greater involvement of governmental agencies in accreditation and other issues of accountability in higher education.

John Boehner is the chair of the U. S. Congress House Committee on Education and the Workforce that is in the process of re-writing the Higher Education Act (HEA). This act provides the most significant source of funding for higher education and includes all federally-sponsored financial aid programs. Congressman Boehner has been conducting hearings and raising several critical issues that he would like addressed as part of the reauthorization process for HEA. Among these issues are (a) accreditation policies, (b) transfer credit issues, and (c) financial aid for distance learning students. He has specifically recommended that "federal student aid programs must include more [distance learning] students and [that Congress] wanted to work with ... accrediting organizations to assure the quality of these expanding programs" (Boehner, 2005).

While he expresses concern for the quality of online programs, he also proposes the possible reversal of federal policy limiting the financial aid of students whose programs were primarily offered in a distance learning mode. Currently, if more than 50 percent of an institution's

courses or students are in technology-mediated distance learning (including online learning), then the courses were defined as correspondence study which meant the institutions could not offer students federal financial aid. In 1998, the U. S. Department of Education established a "Distance Education Demonstration Program" which funded 15 pilot projects in which distance learning providers were granted waivers from the 50 percent rule. Every indication is that in the new reauthorization of HEA either the "Distance Education Demonstration Program" will be expanded or the 50 percent rule will be eliminated altogether. In either case, many more students who enroll in distance learning programs will be eligible for federal financial aid, spawning the growth of such programs.

Boehner's statement also expresses concern for the quality of distance learning programs. Eaton's "price of misunderstanding" may very well be greater involvement by the federal government in an attempt to ensure quality either directly or indirectly through accreditation. This possibility should be of great concern not only for distance learning programs but for higher education in general.

Implications and the Future

William R. Brody, the president of Johns Hopkins University, in a recent article titled "*A* Funny Thing Happened on the Way to the Classroom," stated:

> I like to think of myself as being up-to-date with the latest trends. Unfortunately, much of the evidence points to the contrary. For example, I have been fond of saying that online tools for education have a role but ultimately can't compete with the type of interactive classroom instruction that research universities like Johns Hopkins provide. While I was sleeping, various Hopkins divisions have been experimenting with online courses. The results, I have just learned, show that once again I am far behind the times. The experiment worked—it just didn't work the way I had expected it would. Online courses specifically tailored for distance education have been around for a number of years. And the use of online or interactive Internet tools for so-called asynchronous learning has been gaining in recent years... But, in a recent conversation with Dr. Al Sommer, the dean of the Bloomberg School, I found out something truly extraordinary. It seems that once the online courses had been developed, they began to be used not only by the part-time M.P.H. [Masters in Public Health] students in Botswana but by the full-time students in Baltimore. Fully half the online courses taken in the Bloomberg School are taken by full-time students matriculating in Baltimore. Wow! (Brody, 2005, p. 2)

Brody states well what college presidents and other senior admin-

istrators are discovering about online learning. Online is not simply about distance, but also about student convenience, and perhaps even about preference for the look, feel, and style of an online course. Most importantly, Brody's comment revealed that although he considers himself a well-informed university leader, he did not foresee the impact of online learning in his own institution, especially among local, full-time students. In the introduction of this article, the estimate for the number of students taking fully or substantively online courses in American colleges and universities was established at approximately two million (Allen & Seaman, 2004). Studies by the US Department of Education and the Sloan Consortium of Colleges and Universities support this estimate. However, another unknown with regard to the extent of online learning is the number of students who take courses that are partially online. Many colleges and universities have not yet begun to keep data on "blended" or "hybrid" courses in which part of the course is offered online and part of it is offered in the traditional classroom. As Brody alludes, many senior administrators are not fully aware of what the faculty are doing in the way of online learning. This lack of knowledge is even greater with respect to the blended courses. Whatever the number of students in blended courses, they are likely to add substantially to the 2 million reported for fully online courses. This is important because if, rather than 2 million, the number of students enrolled in online courses (fully online or blended) is actually 2.5, 3 million, or more, this represents close to 20 percent of the total higher education student population. This would qualify as a major change in the way higher education is being delivered in this country.

The growth of online learning has been occurring by the choice of faculty and students as well as by the policies of local colleges and universities. A case may even be made that, in some institutions, faculty and students have been at the vanguard of online learning. Regardless, what is important is that faculty and students are seeing the pedagogical value of teaching and learning online. Were they not, faculty would not invest so much effort in developing online course materials and students would not invest both time and funds in enrolling in online courses.

The small experiments of the 1990's are moving into mainstream higher education. Gary Miller, the former executive director of the Pennsylvania State World Campus, one of the more successful distance learning providers, is now an associate vice president for the University. Because of his expertise in online learning at the World Campus, he has recently been asked to take the leadership role in developing a university-wide plan for ensuring coordination of all online learning activities including all academic (fully online, blended, and web enhancements for traditional face-to-face) programs of the Pennsylvania State University

(Miller, 2005). Large university systems such as the State University of New York, with a minimal history in distance learning prior to 1995, now routinely enroll tens of thousands of students every semester in online courses. The University of Maryland University College, which originally was the adult and continuing education division of the university at College Park, with a largely local student market base, now offers 98 fully online degree and certificate programs and enrolls approximately 50,000 online students world-wide. These developments are not simply accidents or temporary blips but substantive developments in the evolution of higher education.

Can we assume that higher education is already at or near the peak of this online evolution? First, as mentioned earlier, a change in federal financial aid policies that would allow more funds for online students will likely add to the growth of these programs. Under this scenario, colleges that are primarily distance learning providers, especially the newer for-profit organizations, might see significant growth. Traditional higher education should not take the for-profit sector for granted. For-profit colleges have moved beyond small family-owned proprietary schools to become well-run organizations attracting a good deal of corporate and financial backing (Ruch, 2001). The University of Phoenix epitomizes the rise of the for-profit university and now claims to be the largest private university in terms of enrollment in the country. Emphasis here is on the word "private", not simply for-profit.

Second, other major new markets for online learning are evolving as well. As the American economy becomes more dependent on service industries, the need for on-going training and people development increases. Corporations are investing billions of dollars into their own training and education programs as well as contracting with traditional higher education providers. Online learning is a significant component of corporate education programs mainly because it reduces the costs involved in moving people from offices and headquarters to colleges and universities around the country. Another major new market is global education, especially now that eastern Europe, Asia, and developing countries in South America and Africa are actively becoming more involved in the world economy. Many of these countries are emphasizing the need for more technology, English language, and economics in the education of their citizens—all of which many American colleges and universities can provide. However, sending faculty to foreign countries or foreign students to America can be expensive. Online learning can reduce these costs significantly, and more and more American colleges and universities are using this technology to establish relationships with institutions in other countries. Perhaps the most interesting new market

is in K-12 education in the United States. While no one is yet predicting a revolution in primary and secondary education, virtual high schools are growing throughout the country. Thirty-one states have some form of government-funded virtual school (Borja, 2005). Although enrollments are presently modest, some of these schools serve real needs, especially for rural communities that have trouble attracting teachers in subject areas such as science, mathematics, and foreign languages. Online learning is also being used to build relationships that allow students to take advanced placement and college courses while still enrolled in high school. Online learning for these types of secondary school activities makes a great deal of sense because they negate the need for students to move to college campuses for all or part of the day. Every indication is that the increased education markets (corporate, global, and K-12) identified above will grow in the future and it is likely that online learning will play a significant role in this growth.

Lastly, growth in online learning will follow certain demographic patterns. It has been well-established that younger generations are more technology-oriented than older generations. Prensky (2001) used the term "digital natives" to describe the present generation of pre-college students who grew up with online chats and digital technology in their toys and games. For them, the Internet and World Wide Web are second nature. In higher education, new and younger students have already begun to prod their faculty to do more with technology. In another decade, many of these students will be the college faculty teaching the next generation. Already, young Ph.D.s in their first college appointments bring extensive technological expertise to their teaching. For them, teaching online, especially the technological component, is becoming routine. With just a little bit of assistance and some exposure to pedagogy and instructional design, many young faculty are able to do a great deal of online course development on their own. Think what the impact on online teaching and learning will be when the digital natives become the academic leaders.

This article opened with a college president, Neil Rudenstine, talking about the future of online learning in 1997, and ended with another college president, William Brody, being surprised by what had happened in online learning by 2005. In eight years, online learning has become a fact of life in many of our colleges and universities. In another eight years, as the technology advances with greater access to broadband communications, more reliable portability, simpler multimedia integration, and incredibly powerful nanotechnologies, the potential for growth in online learning is quite substantial. The purpose of this article was to examine and to reflect on the implications of online learning on higher education pedagogy and policy. Given the acceptance of the pedagogical practice of

online learning by faculty and students, it is not unrealistic to predict that soon the majority of all college coursework might use some form of online communications. This trend should not be taken for granted but should be understood by policy makers to represent a significant shift in the evolution of higher education in this country.

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Desperate Technologists:

Critical Issues in E-Learning and Implications for Higher Education

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Introduction

I'll admit I had stars in my eyes, the highest of hopes, when I began my journey into the world of distance education. As a faculty member in a technology field, I suppose it was to be expected that I would enthusiastically embrace the future of education with technology (better living through chemistry). However, my early experiences taught me some valuable lessons about e-learning. In the end, I was a desperate technologist, a naysayer, and to my own astonishment I found myself in the rather odd position of being a teacher of the very thing I'd grown to critique—change.

I believed, as did most of my colleagues, that Web-based education was the Great White hope for higher education. Along with the advocates of web-based learning, I thought that radical, system-wide changes in higher education would result from the information technology revolution promising more democratic access to information and learning opportunities (Gubernick & Ebeling, 1997; Hall, 1995). Advocates pressing for public expenditures to build the information technology infrastructure necessary to pursue online education often point to the exclusive nature of an antiquated institution called the university (Agre quoted in Winner, 1998). I bought these arguments. Surely, online education would open the ivory tower's gates to any and all who were interested in learning and this would democratize the university, make it less exclusive and more relevant to the general public. Online learning

would be the way to improve general support for higher education throughout the country and perhaps it could fund more doctoral students and bring in money that would lighten the loads of currently overloaded faculty members. I had stars in my eyes.

I wasn't really aware that there were any criticisms out there being leveled against distance education. It was (and still is to a certain extent) taboo to criticize the distance education enterprise. David Noble (1997, 1998) is perhaps one of the first, and most outspoken critics, offering a historical perspective linking correspondence education with online learning. Most critiques were focused on the degradation of quality inherent in distance education schemes.

Web-based instruction is being adopted at all levels of schooling and it is generating a great deal of interest in the instructional technology R&D community (Hackbarth, 1997; Kahn, 1997, 1998). Encouraging faculty to become increasingly interested and participative in distance education offerings, however, has been quite difficult (Zywno, 2002). Many continuing and distance education (C&DE) arms of major universities are currently trying to understand what motivates faculty to engage in more distance teaching.

Online Education on the Rise

For many faculty today, distance education is of relatively little concern. While online learning is coming into its own, and now blended learning has led to the infiltration of online environments within traditional face-to-face courses, most faculty are still highly insulated from the impacts of online learning in higher education. The Philosophy and English faculty generally do not have to worry about e-learning unless they choose to become involved. Nevertheless, the issues that are faced by desperate technologists are those that should be considered by all faculty because e-learning is on the rise and, while I am not a fan of technological determinism, this fad seems here to stay.

This paper focuses on the current issues associated with e-learning and it's potential impact on higher education. Because online learning still remains a very limited and, in some cases, experimental endeavor at most universities, faculty have not taken an active interest in these issues. However, online learning is rapidly becoming ubiquitous in higher education (Arenson, 1998; Mendels, 2000). The most recent Department of Education survey shows an increase of 72% in the number of distance education programs (Carnevale, 1999). More than one third of all four-year colleges and universities offered some form of distance education in 1997 (National Center for Education Statistics, 1997) and the offerings are on the

rise with 56% reporting participation in some form of distance education in 2001 (National Center for Education Statistics, 2002). Carenevale (1999) reports the number of institutions joining the online education revolution was up more than 11% from 1995 to 1998. In general, public institutions are joining faster than private institutions and larger institutions faster than smaller ones. Traditional distance education entities such as the University of Phoenix are enjoying a huge rise in enrollments and these enrollments are concentrated in online distance education programs (Carlson, 1999). In 2001 more than 3 million students were logging on to enroll in online courses at a variety of institutions (National Center for Education Statistics, 2002) and almost a million of these students were enrolled in fully online programs (Qualters, 2003). In addition, a variety of forms of university-corporate partnerships are becoming increasingly common (e.g., Blumenstyk, 1999b, Beckman, 1999) with 66% of universities offering e-learning involved in some form of consortium (National Center for Education Statistics, 2002).

As of May, 1998, more than a hundred degrees were available on-line from humanities to aerospace engineering (World Wide Web Learning Community, 1998). But by 2002 we have stopped counting the specific numbers of degree programs available online, reporting rather the percentage (19%) of institutions offering whole degrees entirely online (National Center for Education Statistics, 2002). Many of these degrees are available from traditional institutions such as the University of Maryland, Ohio University, Auburn University, and California State University. The growth in web-based education is an explosion unparalleled elsewhere in the educational enterprise (Daniel, 1996; Jones, 1997). Although this area only amounted to approximately $550 million of the adult education market in 1998, the growth expectations are phenomenal. Current estimates are that more than 5 billion (that's with a B) will be spent on online learning this year, and that is up from 1.57 billion in 2000 (Qaulters, 2003). Fueled by fear of open-market competition and recent advances in web-based design tools, the economies of scale for distance education have become *very* attractive to higher education administration. While web-based degree offerings proliferate, the impacts on the broader system of higher education are not at all clear. I would like now to turn to a more detailed exploration of several specific issues associated with e-learning in higher education in an effort to show the complex nature of the online learning enterprise. It is hoped that this discussion will promote a healthy skepticism among faculty for what is currently almost an unquestioned movement (Hara & Kling, 1999).

Quality and Content

Advocates

One of the most natural questions that is raised regarding online education (or any educational innovation) is whether it is *as* effective or *more* effective than what is currently in place. In the case of online education, many comparison studies have been conducted and more are being undertaken to show that online learning produces equivalent or superior educational results to traditional face-to-face instruction. A typical example of such research is Hiltz and Wellman's examination of the use of asynchronous learning networks (ALN) in college level courses (1997). Hiltz and Wellman find that, "[o]verall ratings of courses by students who complete ALN-based courses are equal or superior to those for traditional courses. Dropout or Incomplete outcomes are somewhat more prevalent, while grade distributions for those who complete tend to be similar to those for traditional courses."

In a recent study of school administrators engaged in an online program at the University of Montana, Foster (1997) found that *everyone* in the program had expanded their understanding of professional and personal qualities needed by effective school administrators. Gubernik and Ebeling (1997) report on a study conducted by the University of Phoenix in which standardized achievement tests were given to graduates of bachelor's degree programs from their university and from three competing Arizona public institutions. They found, on average, the online students scored 5-10% higher than their traditional residential counterparts. In general, the question of whether e-learning is as effective as face-to-face has largely been answered by advocates of e-learning with a yes, "nearly all comparison studies show that e-learning is as effective as classroom instruction." (Carliner, 2002, p. 1)

While these studies may be seen as either compelling or self-serving, the quality issue is not prominent in the current debate. Instead, most advocates build their arguments more on the needs of the students for convenient, practical, skills-oriented learning opportunities. Some advocates rely on efficiency or access as their justifications, but few right now are trying to suggest that, in fact, the actual educational worth is *higher* than face-to-face. Some advocates are suggesting that, for certain students, the online format allows for increased interaction from students who typically remain quiet in the traditional classroom (Perelman, 1994).

Skeptics

It is not clear that the findings of comparison studies are valid and reliable. Research on distance education in general, and web-based

distance learning in particular, has not been conducted in systematically useful ways. In her critique of distance education studies, Blumenstyk (1999) calls prior distance education studies "questionable." Russell (1999) completed a comprehensive examination of more than 400 media comparison studies in distance learning and found that, in general, there is not a significant difference between these media, suggesting that there may not be any concrete educational *advantages* in web-based learning. While Russell is an advocate of distance education and admits he was seeking confirmation that distance education was a better form of delivery, he was unable to find supporting empirical evidence of that assertion.

Very few skeptical studies have emerged in the area of online learning. Perhaps the most well-known is the Hara and Kling (1999) study of a small online graduate course which resulted in a high incidence of student frustration. Currently, there is not overwhelming or compelling evidence on either side to suggest that distance learning is an effective substitution for face-to-face instruction. This is not to suggest that we shouldn't continue to conduct a variety of qualitative and quantitative studies to further understand the effectiveness of online learning, but to suggest that the generally positive, pro-innovation nature of most current research in online learning is worthy of question.

While many distance education studies conducted to date focus on the *differences* between the media and, sometimes, their effects on learning, theorists in instructional technology (e.g., Clark 1994) have suggested that we shift our focus away from studies which simply compare the effectiveness of various media and toward a deeper understanding of the characteristics of any given media. The argument here is that certain types of learning lend themselves to certain characteristics of any given media and instructional technologists are searching for pedagogically appropriate matches. This leads us to the question of content areas being proliferated in online learning. The Internet's characteristics lend themselves to information dispensation and the efficiency goals of most online learning programs require large online "classrooms" (much like lectures which also support information dispensation). However, in many instances, we are trying to make the online media carry instruction which doesn't necessarily match its fundamental characteristics of effective information dispensation. Recent reports of teaching law (Mangan, 1999), counseling (Sampson, Kolodinsky & Greeno, 1997), history (Jaschik, 2000), and even physical fitness and exercise (Carr, 1999) online call to question the pedagogical rationale used in determining which content areas will be carried over the wires.

Democracy

Advocates

The importance of offering unfettered access to higher education through advanced technologies, "is not only a challenge for the countries concerned. The security of humankind may well depend on it." (Daniel, 1996, p. 5) Advocates often speak of the democratic importance of distance education in sweeping terms. The underlying spirit of open access, the elimination of elitism as a function of place and prestige, holds for many academics the promise of equity. The basic premise of the rhetoric of democracy in online education is that if we can make educational experiences available to those who currently must work to earn a living and cannot attend residential programs because of geography or family obligations then we are making these opportunities available more equitably. In making the case for convergence of means as opposed to centrality of location as a founding principle for organizing the university, Hall (1995) points out the inherently exclusive nature of university life:

> In fact, all of the university's traditions and practices assume that scarcity is the controlling condition of educational opportunity. As a result, the opportunity for students to pursue a university education must be rationed, parceled out, limited to those most qualified to benefit from it. To a remarkable extent, this sense of scarcity drives the assumption and understandings about what university learning is and should be, fostering a sense of exclusivity among those who guard the gate. (p. 5)

The exclusivity criticism has substance in today's university and broad support in the public mind. As Gubernick and Ebeling (1997) suggest,

> Modern technology brings education to the students rather than forcing students to subsidize fancy campuses and featherbedding faculties. Not coincidentally, it makes it possible for all students—not just those at the fanciest colleges—to have access to the best lecturers and the best teachers. ... On-line education makes it possible for students all over the world to study at prestigious U.S. schools without leaving their homes. (p. 85)

Indeed, the promise of online education is to bring institutions which have been deeply entrenched in elitist notions of prestige and privilege into an era of open access. At a recent meeting (NETFUTURE) of faculty interested in the future of online education Phil Agre called for the collapse of the "long presupposed distance between the educated person and the rest of society." He suggested that online learning may be a way to shorten that distance: "'The model of liberal education depended on a kind of leisure that our students mostly don't have and do not expect to have and can't identify with.' Instead, there is hope. Agre suggests, for 'a positive democratic vision of what a liberal education is, one that would

draw upon the power of digital technologies as an occasion for progressive social change.'" (Winner, 1998, p. 8)

In addition to open access as a way to move us beyond elitism, online education has the potential benefit of increased anonymity among participants. Although some would argue that this could be a deficit, increasing the problematics of building strong community, others (Hiltz & Wellman, 1997) suggest that this anonymity can create strong bonds among socially diverse groups with heterogeneous social characteristics, including lifecycle, sexual orientation, gender, ethnicity, and socioeconomic status. Thus, open access and consequent potential for anonymity are democratizing forces which advocates of online learning point to as strong justifications for the advancement of distance education.

Skeptics

While it may be true that online education offers anonymity, and open access which invites diversity, there is nothing inherent in the characteristics of the online media itself which forces any sense of confrontation or contact with that diversity. There is no need in a completely anonymous space to share details about oneself, particularly should one be concerned that those details might be judged negatively by others in the online community. For instance, how likely is it that someone would confess they are of a poor background in an online MBA class? And without this information, which might be deduced through face-to-face contacts and relationship building, how likely is it that those involved in the online education experience will realize that they truly are involved in a diverse learning group? It is central to the construction of a viable democracy that diversity is recognized and celebrated rather than concealed or overlooked. It is not inherent in online education to advance either of these agendas, but rather the media lends itself more to concealment than to revelation.

Some theorists (McChesney, 1998; Sclove, 1998) are concerned that while the rhetoric of open access appears to generate movement toward democratic goals, there is no evidence that this is likely within capitalist societies.

> Some have argued that the Internet will eventually break up the vise-like grip of the global media monopoly and provide the basis for a golden age of free, uncensored, democratic communication. Yet whether one can extrapolate from activist use of the Internet to seeing the Internet become a democratic medium for society writ large is another matter. The notion that the Internet will permit humanity to leapfrog over capitalism and corporate communication is in sharp contrast to the present rapid commercialization of the Internet. (McChesney, 1998, p. 21)

Thus, while open access carries the possibility of a democratization of higher education, there are also corresponding concerns. As in the cases of international distance education in South Africa, China, Ireland, England, and the U.S., the reality of open access can be far more complex than advocates and politicians may lead us to believe (Carr-Chellman, 2005). For example, who actually has "anyplace, anytime" access to online education? Those who truly have access are primarily those learners who own computers and can pay the tuition and/or travel costs associated with the program—and these are typically personal costs. Therefore, the programs help those with a certain amount of disposable income, not the poorest of our poor.

Another issue deflating the democracy justification is that many educational opportunities are already available for working or place-bound students who attend University of Phoenix, Walden, or Nova Southeastern. These programs have open access, distance delivery, reasonable prices, and, over the years as distance education specialists, they have been able to produce quality *degree* programs to meet customer demands in an efficient manner. So why does NYU, Penn State, Stanford or Auburn want to compete with them for the students who are already well-served by an established distance education system? Is it possible that there is a more opportunistic motivation at play? Is it important to offer *brand names* to the lifelong learning consumer? What impact does that fiscal and philosophical choice have on the place of higher learning in our society? Thus, the assertion that online educational opportunities will democratize higher education has not yet been adequately proven or justified.

Efficiency

Advocates

Efficiency and democratic access are perhaps the primary justifications for web-based education offered by advocates. Advocates argue that public financing for higher education is being dramatically cut at the same time that the children of baby-boomers are arriving at the university threshold (Jones, 1997). In addition, the paying customers of higher education are increasingly budget-minded (Daniel, 1996). As early as 1997, advocates (Hettinger, 1997) were pointing to cost savings as one of the important reasons to create the online learning enterprise:

> A Western Governor's University goal is cost savings for students as well as educators through increased competition...WGU enjoys the advantage of low overhead. 'We don't have a faculty. We don't' have a campus.' Students probably won't see lower course fees but will save on such associated costs as transportation and child care. Utah Governor Mike

> Leavitt told a congressional committee last spring that an online university can provide lower-cost education than a conventional university, though he did not provide specifics. (Hettinger, 1997, p. 21)

One of the common themes that runs through this part of the debate is the pressure on higher education to respond to workplace needs and budget crunches. Silvio (1998) describes this temptation:

> Some of it's (online education's) possibilities are the reduction of operating costs for teaching and learning programs, increased control of learning by the learner, more interactivity...individually paced learning and lifelong learning. ...All of this seems very tempting to higher education, which is so very pressured by the exceedingly high demands made upon it by society. (p. 8)

Some of the advocates recognize that the efficiency argument outweighs even quality arguments (Gubernik & Ebeling, 1997). Jones (1997), who is the founder of Jones University, one of the first virtual institutions to gain state level accreditation, writes: "While there will never be a substitute for the ivy-covered experience of the college campus, advances in computers, cable television and satellites and the ubiquitousness of the Internet and it's World Wide Web should and will make higher education available to the most people at the lowest cost—worldwide." (p. 45)

In order to best meet efficiency goals, it is necessary for online education to limit itself to primarily information dispensation for economies of scale and simplicity. There are those, however, who feel that efficiency is an issue that is out of alignment with the educational goals of institutions of higher education.

Skeptics

Perhaps one of the most compelling skeptics for the efficiency argument is Michael Berube (1998). In his recent editorial, "Why inefficiency is good for universities," published in the Chronicle of Higher Education, he suggests that the efficiency equation requires a consequent loss of quality of experience,

> When you're 'teaching' 10,000 students by satellite or over the Internet, there's no way you can read and grade their papers, counsel them on their courses, work with them on their prospective careers, or write them letters of recommendation for jobs and postgraduate programs. Personal, individual contact with students is one of the most costly and inefficient services a university can provide. It is also one of the most valuable—and the most educational....

Indeed, on-line degree programs have the potential to be efficient; however, the impact on effectiveness and quality is not effectively ad-

dressed by advocates of web-based education. Despite its significant market demand and its apparent utility, web-based education is not without its critics (Drucker, 1995; Galusha, 1998; Noble, 1998). The idea that an online educational experience may be qualitatively different and one-dimensional despite similar or better test scores, for instance, is not typically a part of the equation for determining its value. The impact on the university as a place, the university environment and culture as a whole (Drucker, 1995) does not currently enter into the efficiency calculation.

Some theorists are already asking the question, is distance education really an efficient means of facilitating learning? The Internet has shown that it can be a good way to disseminate information, but the information may not be reliable and almost everyone who has spent time surfing the web knows the inefficient use of time spent to find information among the huge storehouses of data currently available online. David Noble (1998) has pointed out that the economics of online education really don't pan out as well as administrators had hoped. In order to make online education work efficiently, large numbers of students must enroll in courses and degree programs taught by relatively few faculty assisted by teachers aides. While our public institutions warehouse freshmen and sophomores in large lecture halls, parents and the public decry the lack of education possible in such an approach. Many institutions are, therefore, encouraging faculty to teach smaller undergraduate courses. Now some distance educators and administrators wish to reverse that trend and impose the large lecture model on graduate education as the Masters Degrees in many vocational areas are the hottest selling online education ticket today.

Most faculty involved in these degree programs recognize that learners need a high level of interaction and attempt to build that into their courses, requiring certain numbers of postings to listserv discussions and such. However, this approach is time consuming for students and faculty who may get hundreds of postings daily, many of which are redundant or compliant without substantively discussing a topic. In fact, current research into the effectiveness of collaborative online learning among solitary learners strongly suggests that too much of the online discussion postings are social rather than substantive (Ke & Carr-Chellman, in progress). To replicate the many interactions that typically take place in a graduate classroom, the connection that a faculty member carefully fosters among her students, the in-depth feedback offered for student assignments—all this is difficult, if not impossible, online.

Advocates suggest that we should not be replicating current modes of learning online, but should discover what types of learning the medium best facilitates and design instructional environments which capitalize on web-based advantages while minimizing its disadvantages. The medium

is an efficient and relatively effective dispenser of information, but as yet, it has not proven to be an efficient learning facilitator. Richard Sclove articulates what many of us familiar with the Internet already suspect, "I find the Web useful when I have a conceptual framework built up already, and I just need a few little factoids to plug in to illustrate points. The Web is marvelous for that. But it's not a vehicle for building up depth of intellectual understanding. The extent to which students rely on the Web as their primary learning vehicle is deeply troubling" (Sclove, 1998, p. 15). Instead of asking what the Internet allows us to effectively do (dispense information) and designing instruction to fit that medium because it is efficient or glitzy or fundable, we should instead be asking how do people best *learn* a given topic, and create learning environments on- and off-line that meet those learning needs.

The assertion that online education is efficient is related to the assertion that online education is also more democratic. If the purpose of expenditures to build online learning infrastructures is democracy, then costs should not be an issue. The advancement of a democratic learning system which truly reaches out to all, and advocates for all, regardless of ability to pay should prevail. However, in a somewhat contradictory stance, cost effectiveness and democracy are both used by advocates as primary justifications for the initial technology investment.

Wiring the world is not a cheap proposition. Politicians would have us believe that investing in technology (at the expense of other more traditional spending) is necessary and unstoppable—and most important it will benefit everyone, it will be a public good. Noam Chomsky (1998) suggests our faith in this assumption may be misplaced:

> It's particularly harmful to democracy when media systems are in the hands of private tyrannies...Here's this huge system, built at public expense. Most media analysts with their heads screwed on see, and even report, that it's very likely going to end up in the hands of a half-dozen megacorporations internationally. (p. 188)

Naturally, these megacorporations may be willing to pay for part of the expenditure, although how much is not entirely clear. Much as our sports stadiums are being built with a sponsor's name prominently displayed when the public has paid for a larger proportion of the building expenses than has the corporation, politicians are billing these expenditures as 'good for our community' or, in the case of online education, 'advancing the goals of efficiency and democracy through open access and workforce development.' However, to the extent that corporations are willing to pick up the tab, it will be because they perceive a profit payoff. As Kirschkop (1998) puts it,

> The relatively low cost of PCs and modems disguises the enormous costs of computing research and development as well as the laying down and maintenance of a network infrastructure. The money has to come from somewhere, and that somewhere is going to be the federal government and those corporations (IBM and AT&T for instance) that can look upon it as an investment in future profit rather than an extension of democracy. (p. 213)

What will these corporations (and for that matter our own federal government) want for their investment? Baseball stadium sponsors only want the chance to advertise—repeatedly, but where education is concerned, there may be more far-reaching demands. Corporations spend billions each year on training; online education brings the university to the corporate doors and paves the way for a transfer of costs from the corporation to the public for vocation-specific skill building. With the advent of corporate universities, there is no reason why a corporation, underwriting the online education infrastructure, couldn't demand control over the curriculum, creating an even more direct fiscal link between public universities and corporate training needs.

In such a marketplace of vocational education opportunities, what will happen to those courses on Shakespeare, Kant, and Impressionist painters? What will happen to unpopular, unmarketable, and non-vocationally oriented ideas? Higher education has always been the bastion of unpopular ideas. As a public institution, higher education may have fallen away from making itself relevant to the public, but it has always maintained a space for even the most politically incorrect ideas. Can this ideal survive in the face of online education, tightening budgets, and corporate capitalism's continued encroachment on our university culture?

As Winner (1998) points out, "State legislatures would now rather invest in digital bandwidth than spend money on conventional settings for teaching and learning." (p. 9) This concern is more clearly laid out by Lawrence Gold, higher education director for the American Federation of Teachers (Olsen, 1999). Referring to distance education expenditures, he states that those same legislators who are "not interested in providing more facilities, not interested in beefing up video-conferencing programs, not especially interested in teacher salaries, and certainly not interested in replacing adjuncts with full-time faculty members are in fact very interested in spending a ton of money for something we don't know a whole lot about." (p. 3)

If we consider how best to invest public monies currently being spent on technology and marketing for online education, it might seem anti-change or even Luddite-esque to suggest that we revert to more support for conventional learning environments. On the other hand, it may not

be too much of a stretch to suggest that where there are twice as many marketers and managers as teachers and instructional designers (as is too often the case in many Continuing and Distance Education Departments), we may have a misalignment in terms of the mission of an educational institution. Since the monies must come from somewhere, and the most likely proposition is a redistribution of funds already available for traditional initiatives, the fiscal implications of online programs are substantial and disconcerting. If we cannot be assured that the promises of democracy and efficiency will be delivered, in the face of concerns over shifting the burden for expensive corporate training from private to public funds, why should we shift monies away from traditional instructional functions? Do we have any notion of how many full-ride scholarships to how many institutions might have been afforded by the millions, billions spent on building online e-learning universities?

In the end, as Berube points out so eloquently, learning is usually a very labor intensive process—a highly inefficient process. Putting education online doesn't change that fact unless we plan to make qualitative shifts in the nature of higher education to take the labor out of it. Thus, it has not been shown conclusively that online education is inherently more efficient, and therefore we should continue to study and question this assertion.

In the following two sections, the debate around online education is not addressed as the advocates and skeptics frame it, but rather from the specifics of the issue, because in these particular instances, the issues are equally of concern to both groups.

Who Owns It?

Perhaps the most hotly contested terrain in the online learning discussion today is the area of intellectual property (Carnevale & Young, 1999; Young, 1999; Zhang & Carr-Chellman, in progress). The university was relatively unprepared for the online revolution and did not have appropriate policies to govern the ownership of online courseware. Noble (1998) reports on the issue of copyright, ownership, and faculty reactions to these issues in the online world in his original "Digital Diploma Mills." In it, he writes,

> Once faculty put their course material online, moreover, the knowledge and course design skill embodied in that material is taken out of their possession, transferred to the machinery and placed in the hands of the administration. The administration is now in a position to hire less skilled, and hence cheaper, workers to deliver the technologically prepackaged course. It also allows the administration, which claims own-

> ership of this commodity, to peddle the course elsewhere without the original designer's involvement or even knowledge, much less financial interest. (p. 9)

Most universities and, particularly, divisions of continuing education would like to maintain total control and ownership over courses developed for online delivery. But faculty who have been stung by the video course fiasco of the 1980's in which courses were delivered repeatedly, in essence eliminating the need for faculty, are leery of such agreements and many are refusing to sign away all rights. In some cases, the universities assert "work for hire" contract stipulations to capture ownership rights, while faculty assert intellectual property rights of their own. Using old models of patents, funded research, or consulting seem to be outmoded and not able to keep up with the current maelstrom surrounding the issue of who owns and, therefore, who controls the future distribution and use of courses developed for online delivery. Indeed, rather than framing this from an advocates/skeptics perspective, it would be more appropriate to frame it as a labor/management, or faculty/administration perspective.

There are no simple solutions to this problem. Naturally, the AAUP wants more faculty input into distance education program design and implementation while university administrators want to maintain as much control over the courses as possible. And individual faculty typically want only to ensure that what goes out onto the wires with their name on it is relatively updated and appropriately utilized. There are no research studies which can guide us in this debate. There are only a few positions which seem highly self-serving at the current moment, and a few papers which outline the various positions (e.g., Ke & Carr-Chellman, in progress). Ultimately, the resolution will come over time through many negotiations between various faculty, unions, and administrators across the nation at many different types of institutions of higher education. While it may seem that distance education is still a relatively small scope enterprise, the foundations of the rules we will live by are being laid. As faculty, we should concern ourselves with these policies and actively engage in the negotiations to ensure that all members of the university community, particularly students, are protected and honored and that no member of the community is taken advantage of.

Time and System Implications

Social isolation among Internet users is being increasingly pointed to as a source of depression and declining social interaction (Kraut, et al., 1998; Sleek, 1998; Taha & Callwell, 1993). So, in the name of lifelong

learning, or keeping a job, workers are being asked to forgo leisure time with their families and friends and, instead, update their skills through the web. This pressure is part of the reformulation of capitalist culture in what is largely understood as the postmodern era. Simpson (1995) points out, "Postmodernism's emphasis upon novelty colludes with capitalism's interest in proliferating and expanding desire and with the technological promise of satisfaction. The 'good life' that technology tends to deliver is one of 'endless novelty, change, and excitement, ... unlimited possibility,' in short, just the speedup of life that is characteristic of postmodernism." (p. 153)

Simpson's main emphasis is on the ways we use technology to overcome time. This is clearly the case in distance education, "technology's ability to shrink space and time is often viewed only instrumentally, that is, as being merely the ability to decrease by degrees the 'distance' separating the desiring subject and the object of desire, and to do so without in any significant way altering the subject or the object." (Simpson, 1995, p. 3). However, I am not at all certain that this collapsing of time and space does *not* alter the learner, the faculty, the content, or the university in critical ways.

In my experience teaching distance courses, most distance education students come to the activity because they want pragmatic answers that they can apply to their full-time jobs. Distance programs do not seem to attract students who are interested in immersing themselves in a field of study or learning about theoretical constructs, history of the field, background information, and the like. Perhaps because of the marketing, which emphasizes convenience and real-world learning, or because of these well-intentioned students' conflicting goals to work full-time and go to school while also raising a family, the distance learner is not well suited to traditional residential degree program objectives—particularly at the doctoral level. To the extent that traditional brand-name universities offer online degree programs in addition to their residential programs, they are likely to have a dramatic impact on faculty and student lives.

The system-wide implications of such a shift are substantial. Recent studies of Internet experiences indicate increased isolation (Sleek, 1998), access equity gaps (Gladieux & Swail, 1999), and questionable quality (Thurber & Pope, 1998) of distance education programs. To the extent that we are merely placing raw information (lecture notes) on the web, we are often replicating the worst of traditional university learning experiences at a distance. The concerns and skepticism over the potential commodification of higher education appear well justified. Distance education unfettered has the potential to relegate universities to a role in our society devoid of all the hallmarks of a community of scholars.

Unpopular ideas may die out completely as a result of a lack of marketability in the wide and fast moving online education movement. University programs may become increasingly vocational in nature, focusing on an ever-changing array of "hot topics". Differentiated staffing is likely with a few highly paid faculty performers, making information dispensation entertaining while masses of poorly paid part-time instructors, graders, tutors, and the like maintain direct contact with students.

We may try to move away from this model in residential instruction, making face-to-face higher education more labor intensive with smaller undergraduate classes. Meanwhile, we are relegating many adult learners who are lured by the promise of career advancement to a labor-poor, information-rich learning experience. The actual effect of this is to free up more monies to make high quality residential education even more exclusive for those who can afford to attend, while working and middle class learners are served by a distance learning system and the poorest have no access at all.

While the university will continue to make large profits, the local businesses in college towns may suffer. The potential economic impact on small college towns is currently incalculable—and actually not of much interest to most who are keeping track of such statistics. If students who might have attended residentially are staying home, ordering their books online, buying groceries in their hometowns, there could be a slowing or decline in student populations in towns like State College, Pennsylvania; Madison, Wisconsin; Bloomington, Indiana; and Ann Arbor, Michigan. On the other hand, those distance education arms that are highly successful may bring more jobs to an area with clean industry and relatively well-paid employees. The jury is altogether out on this particular potential system impact.

Naturally, none of these predictions may come to pass depending on the extent to which distance education is implemented and diffused throughout the system and how well distance degrees are accepted by faculty, students, employers, and graduate schools. However, the underlying cause of the rapid proliferation of distance education will not have disappeared. The fact is the university is making itself into a business and operating in more business-like ways every day. And faculty everywhere are accepting the increased involvement of corporations in curriculum and research directions. While faculty bemoan the lack of funding available in higher education, millions are spent on new technologies and infrastructure. This is money that might be spent making the case to the public that the university is still a relevant and important public institution that needs maintenance if it is to survive. And amidst the institutional conflict between business goals and educational missions,

the university administration puzzles at the lack of loyalty among faculty that their institutions inspire. I believe that we must pay attention to the underlying corporate model of an efficient industrial-age university and fight against university policies made based primarily on profit motives.

At the very least, faculty would be well-advised to strongly advocate for some differentiation between traditional residential instruction and distance education. The history of correspondence courses (Noble, 2000) should have taught us that firewalls between the university and distance learning are a necessary, if elitist, evil which is likely to advance, not detract, from the goals of democracy in higher education. If we allow no differentiation, then administrators and legislators feel that education equals information dispensation and there are no differences between residential and online education experiences. If we, as faculty members, suspect that there *are* indeed differences, then we must defend the right of all—the poor, the diverse, the under-served—to equal access to quality, funded educational opportunities. Distance education cannot become the bone we throw to those who cannot qualify for increasingly scarce scholarship dollars. While distance education administrators may see an undifferentiated transcript in which all courses have the same names and numbers regardless of modality as progressive, it can aggravate alumni (Daniel, 1996) and create confusion in the marketplace for students.

Conclusion

The future of distance education needs to be carefully shaped. Faculty and distance education administrators need to be savvy about distance education offerings. If we choose to continue down this path, there are several specific concerns that we should consider as we move ahead:

- Corporatization of the curriculum
- Equal access to technology among haves and have-nots
- Pressures on learners and potentials for isolation and depression
- The possible elimination of unpopular or unmarketable ideas
- Efficiency of labor-rich distance learning programs
- Learning effectiveness of information-rich distance learning experiences
- Reallocation of budgets toward technology and away from traditional residential instruction
- Appropriateness of student population for goals of graduate degrees
- Expectations of learners based on advertisements for distance learning
- Differentiated staffing patterns
- Vocational curriculum emphases
- Economies of small college towns
- Promulgation of the poorest forms of instruction
- Aggravation and confusion among graduates of residential programs

- Effects on diversity of learning groups and learners' confrontation with that diversity
- Copyright and intellectual property issues

Certainly, this list is not exhaustive and we'll learn much as a result of this first step into e-learning. For faculty in today's university setting, many pressures are constantly being balanced. The pressures to publish or perish, to increase class enrollments, to deliver excellent educational experiences, to advise students well about their futures, to make money for the university through grants or conducting distance education courses, and, not least of all, the pressure to make an important contribution to the body of knowledge in an academic field. None of these pressures will likely dissipate in the coming years. Some of them will become increasingly difficult to resist. Given the recent tendency of institutions of higher education to continually move toward business models of operation, the pressures to increase efficiency, productivity, and profit generation will likely become more heavily emphasized. You may have to choose your poison. Because of this, faculty must become clear about their roles, both personally and collectively, in the institution of higher education. They must be smart, not just intelligent, about the way they conduct their business—particularly where distance education is concerned.

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Book Review

Recapturing Technology for Education by Mark Gura & Bernard Percy

Reviewed by Nelson Coulter
Texas Tech University

Addressing the issue of technology integration into the modern classroom is the focus of *Recapturing Technology for Education: Keeping Tomorrow in Today's Classroom* (Scarecrow) by Mark Gura and Bernard Percy. The authors cover the issue from a wide range of perspectives. The book is a worthy read for current theoreticians and practitioners in the field of education, as well as for policymakers who may (or may not) be educators.

The authors build the case for their ideas from the presupposition that the proliferation of technology is progressing globally at breakneck speed, everywhere *except* in school classrooms. Their argument is clearly flavored by the disappointment experienced by Gura in his work of directing a $100 million plus effort in the New York City schools, an ambitious project designed to integrate technology into the fabric of the pedagogy deployed in the system. While noting some successes and remarkable stories of the successful application of technology into pedagogy, the authors note the difficulties encountered when dealing with the resistors and the barriers confronted along the way. An undertone of frustration is evident in their description of the battles fought and often lost and the initiatives that fizzled.

A portion of the text is also spent on the philosophical debate of whether we should teach *about* technology, or *with* it. Extending upon this philosophical dialogue, the authors review the positions taken and arguments made by those who oppose the full integration of technology into the classroom (folks they call the "naysayers"). The authors are also

careful to include the academic intelligentsia of higher education among the antagonists/resistors (describing them as the "typewriter generation"). After reviewing the positions of the anti-technology group, Gura and Percy move into a methodical debunking of each argument. Herein lies a significant value of the book. The authors frame their position against the risks to schools, the nation, and society if we fail to aggressively integrate technology into classrooms and, more specifically, into the instructional methodologies deployed in schools.

The most valuable portion of the book, in my opinion, is in the discussion of *how* the technology can be integrated into pedagogy. How? is usually the question asked by antagonists/resistors of any particular change initiative of those who are promoting it. With that in mind, the authors engage the question with a thorough explanation of *how* it can happen.

The authors effectively connect the use of technology to teaching in each of the academic disciplines. Gura and Percy launch a deliberate and methodical discourse on the specific strategies that can be employed for using technology in the classroom. In specific terms, they provide guidance to aid teachers in the actual use of technology as a tool to affect learning (their own and that of their students) and to help students assimilate the disposition that technology is a tool for learning, rather than a novelty or toy. The authors also make an interesting case for the impact on traditional curriculum when technology is effectively implemented in the classroom setting (noting that herein lies some of the significant resistance to change). A listing of interesting and educationally powerful websites follows (related to the various disciplines); a brief description of the content and/or structure of each is also provided.

The authors provide detailed advice for the various levels of decision makers that can and do have an impact on the degree of technology implementation in classrooms. They list action items for state education departments, for district administrators, for teachers, for campus administrators, for hardware and software producers, and for university personnel.

The purpose of the book, by the authors' admission, is to keep the discussion related to the full integration of technology into the classrooms of the nation moving forward. They share their hopes of finally reaching the critical "tipping point" that will accelerate a proliferation of technology application in the national pedagogy. They envision an eventual cascading of the integration of technology into those classrooms. Toward that end, Gura and Percy make an excellent case. The trick will be to convey their thoughts in a convincing manner to the right people. If they do, they may just reach that "tipping point" sooner rather than later.

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